

In This Issue—Used Car Conference

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MOTOR AGE

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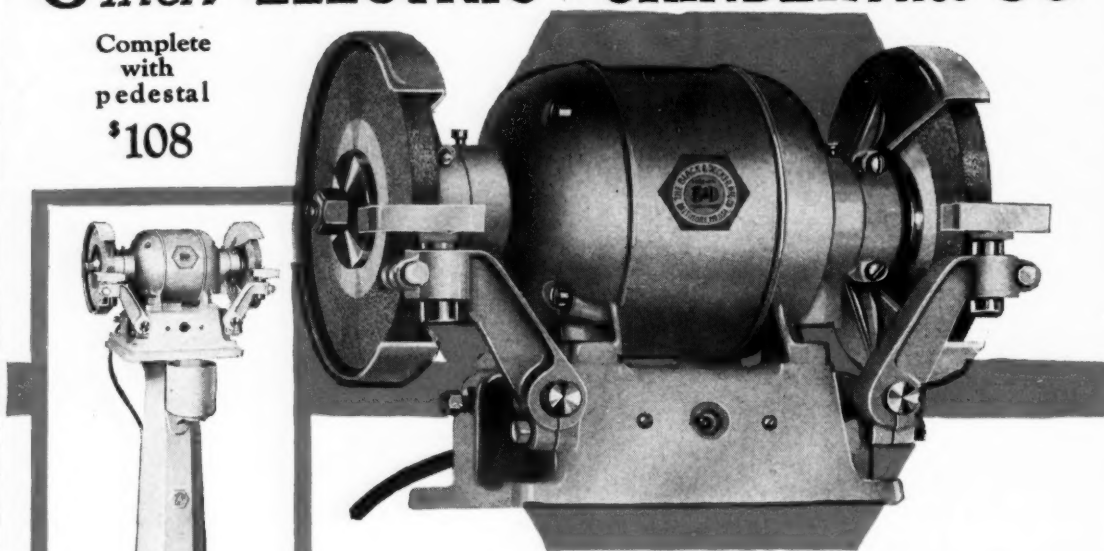
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**"The Well-Equipped Shop
Gets the Business"**



MOTOR AGE

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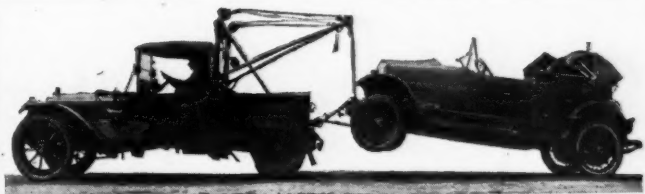
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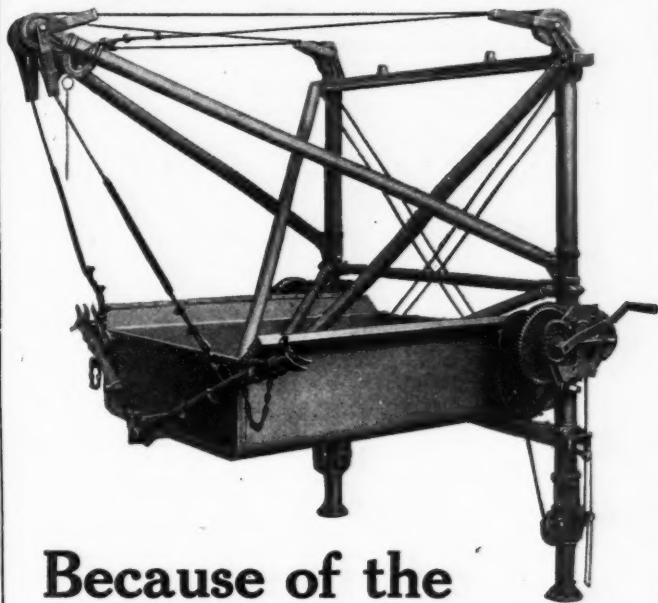
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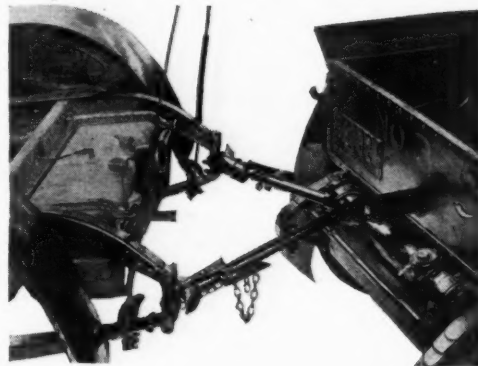
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George Beckley

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EIGHTS

MOTOR AGE



Here is a group of maintenance men assembled for the purpose of having a factory trained man enlighten them about various units of the cars and trucks on which they are used. Good results are sure to be had from such meetings, as is evident from the success those dealers are having who have instituted regular sessions for the men

Get Your Men Together

One of the Surest Ways to MAKE MAINTENANCE PAY is to Promote a Good Spirit Amongst the Employes. Meetings of Educational Nature Valuable. Sessions Should Be Held Regularly

By B. M. IKERT

"OH, yes, I got a dandy bunch of men in the shop. They are all for the business and we get along fine." That's what a successful motor car dealer told us one day while we were making an inspection tour of his shop and noted the apparent excellent shop morale.

We remarked that was fine and the dealer said:

"Well, I'll tell you, you have to be decent to them and let 'em know they are darned necessary to the business. I go around the shop every so often and mix with them. I try to make them feel that not all the things necessary to the successful operation of my business are done in my office. I know that every man in my shop must be with me, or he can tear down a

sales effort and create resistance to the institution in the twinkling of an eye. Have the gang with you and your business is bound to grow."

The dealer was called to his office to answer a telephone call and as we stood alone for a time in the shop a mechanic close by was asked how he liked working for the — Motor Car Co. and for Mr. Irwin. He said:

"Swell. This is a real place and the chief is a white man. The place I was before was a fright. You could do a job any old way you liked. The boss didn't care and he didn't care about knowing if he had any boys in the shop that were any good. A bum mechanic had as much chance as a man who tried to get ahead and do good work for the company. But in this shop every man has a chance to demonstrate his worth and what's best, we're just like one big family." And so he

went on to tell all about how well he liked the place and the dealer's way of doing business so far as the men in the shop are concerned.

All of which simply goes to show the value of getting together with the men in the shop for the common purpose of co-ordinating the efforts of the various departments that the business may flourish with permanency assured.

Of course, in the larger establishments it is not so easy for the dealer himself to work hand in hand with the men in the shop, nor is he expected to. He must watch at all times the functioning of all departments and consequently cannot worry over details concerning any particular department. As a business executive he is not expected to do this.

So far as the shop is concerned, it falls to the lot of the service manager to promote the interest of the employer. It should be borne in mind that by the word shop we mean here the entire maintenance department, including not only mechanics, but the service salesmen, helpers, car washers, painters and parts department employees. Every department is important; not one can exist in itself. Who is there that dare say the parts department is more important than the laundry or car washing department? A satisfied customer in the first easily can be turned away in the second by a poor job of car washing. Consequently the need for everyone in the shop, from service manager to floor sweeper, getting in on the get-together meetings.

Many mechanics are inclined to be skeptical and have to be shown. By winning their confidence, showing them that they are just as important to the organization as any other men, they soon learn what it means to put their shoulder to the wheel and work with genuine interest. But they must be shown.

They must realize that it is fatal for them to slight any operation that means a "comeback" on the part of the customer which could easily be avoided by a proper understanding between customer, service manager, foreman and mechanic.

For example, a mechanic might be putting together a differential and in the absence of the inspector fail to properly lock one or two bolts or adjustments. If he has not the correct spirit toward the organization, he should worry if he leaves out a few cotters and knows the customer will come to grief and be in again for the work to be done a second time. As long as he gets his \$3 or \$4 per day, why worry?

Then again, suppose a sincere mechanic in the shop has done a dandy job of refitting main and connecting rod bearings for a customer. The customer has had assurance that the job will be right when he gets it. And it is right, so far as the bearings and the mechanical conditions of his car is concerned, but what of the gob of grease that was left on the steering wheel by a careless car shifter who took the car from the shop to the delivery floor? That careless car shifter has nullified all the efforts of the careful mechanic who took pains to see that the customer got a good job of bearing work.

There are dozens of other things that could be mentioned and which happen every day in some of our largest maintenance departments. Almost invariably a car that has been left in the shop for mechanical work will have a dirty steering wheel rim and the running boards will be defaced with marks of shoes that have tramped over grimy floors.

If you, as a dealer, doubt these statements go into your maintenance department and drive any of the cars which are ready for the customer. Ten to one you will come back with grimy hands and find the running boards as stated. True, some of the better conducted maintenance departments watch this and keep a man busy doing nothing but making the cars presentable for their owners.

Getting the men in the shop together is largely a matter of winning their confidence. They must realize that conferences or get-together meetings are held for their benefit. They must, above all things, feel that these meetings are not being held to "show them up" because some of them may not know certain things about automotive repair work.

For instance, many a good shop man knows just how to do a certain job and do it well, but when asked why he does a certain thing he is at a loss to tell the reason. We know of men in some shops who hesitate to ask certain questions concerning phases of their work for fear the foreman or service manager may feel they are incompetent. These men have not yet learned that education never stops and that automotive mechanics must learn of new methods and theories as well as doctors.

A mechanic will hesitate to ask the foreman point blank about a certain thing, although he feels perfectly free and easy to ask a technical question in a meeting conducted for the purpose. We recall a case where a mechanic, who, by the way, was one of the best men in the shop and could tune an engine with the best of them, for a long time desired to know the theory behind an ignition coil. He knew that the current from the battery was "stepped" up many thousands of volts by the coil, but how? He did not like to ask the foreman and it was not until the dealer arranged for an electrical expert from the ignition makers to talk to the men in a body that he found the answer.

The winter season is the best to hold regular meetings for the men and a meeting about every two weeks works out well in most cases, although some organizations have a plan whereby the men get together once a week.

It also is a good plan to hold these meetings during regular working hours, because it always is more or less difficult to get men to come back after working hours and besides the men feel a lot better when they know that the organization is sufficiently interested in them to hold these meetings during regular working hours and WITH PAY. By all odds the men should be paid for the hour or so during which the meeting is held. Their pay must go on without interruption.

If the shop works on a piecework basis, then let the men be paid the

same price they get per hour when idle. For instance, one shop working on the piece rate plan pays its men 50 cents an hour while idle, or "between jobs." This is done to keep the mechanic on the spot and keep him sufficiently interested, so he does not feel like quitting his job.

Educational work among the men is one of the greatest things that the dealer can do to make his maintenance pay. There are a hundred and one things that can be discussed at such meetings. Trained men in various fields, such as the electrical field, carburetion and bearings are available from the factories and can talk to the men, the latter having the privilege of asking questions. The dealer can talk at some of the meetings, the service manager and shop foreman at others and some of the sessions can be given to an open discussion by the men on any pertinent question.

Let a question box be established into which the men drop slips of paper from time to time containing questions they would like discussed or answered. It is surprising the nature of some of these questions. They will vary from the flat rate system to the most approved method of cleaning a spark plug. And speaking of a spark plug, let us tell you what happened the other day in a shop.

A mechanic was asked to clean several plugs for a man who was an expert in engines. The mechanic was careful to polish the points of the plug and disregarded the porcelain or interior of the plug, which was wet with oil. The customer told him he cared nothing about cleaning the points but wished he

Teamwork in the Shop

"The service manager must be to his men what the coach is to the football team. The coach builds up teamwork. Individual stars are fine, but they will get further on the team when every man plays the game right. Formations mean little unless every man on the team knows just what his particular part in the play is and not only that, he must know just what his teammates are going to do. He must know who is going to carry the ball and who makes up the interference for this man, as well as what is expected of him. In other words, he must know what he as an individual and what the team as a whole is to do."

"Thus if the men in the maintenance department get the right angle on the business as a whole and then establish firmly in their minds just where they fit into the organization, it is only logical to assume that a business under such conditions will flourish in accordance with good business ethics."

would clean the interior of the plugs. The mechanic replied that the porcelains had nothing to do with the spark and what you must do was to clean the points well for the "current to go through."

There was a case of where a mechanic could have been enlightened on plugs by a get-together of the shop men at which an expert ignition man, or even the foreman, for that matter, might have talked.

There are various ways in which the men can be brought together. One service manager who wanted to instigate regular meetings for his men went at it like this: He found out that a factory field service man was going to be in the town on a certain day and arranged with this man to talk to the men in a body instead of individually. This the man did. He told the men that he had things to talk about which were common to all and that less time would be lost by talking to the men collectively. He provoked discussion among the men and wound up his talk by saying, "It would be a fine thing if you boys got together once in a while and talked over these things."

A few days afterwards the service manager went among his men and asked each, when the opportunity presented itself, how he liked the little meeting the other day when the man from the factory talked. The majority of the men thought

well of the meeting and stated they had obtained much good out of it.

The rest was easy. It was just a case of organizing the men and founding the meetings on an educational basis. Arrangements were made to get various men to talk before the gatherings and eventually the meetings were looked forward to with keen interest, as the men had come to realize that only good came out of them. Interesting questions were asked and as time went on better methods were developed in the shop; the men were happy, took pride in their work, the dealer made more sales of new cars and maintenance work and the business as a whole prospered.

Get the men together socially. Suggest to them a social organization, a baseball team or something of that kind. Let them handle it. They will pick out a suitable name for the organization. Maybe they like to bowl. Let the dealer offer a prize for the best bowler. It is surprising how the men will respond. The result is apparent in the work of the men, too.

In practically every shop where a social organization has been formed the men are happier in their work and the business is making money because of it. One dealer even went so far as to put a tennis court on the roof of his building. The men used it during their lunch hour. It just goes to show what some dealers are doing along this line. Getting the men together will more than pay for the little time and money it takes on the part of the dealer.

Fair Prospects for Fall Reported at N. A. C. C. Meet

**August Sales Generally Were Better
Than Those for July—Some
Decline Expected**

NEW YORK, Sept. 16—Dealers' report presented at the first fall meeting of the directors of the National Automobile Chamber of Commerce indicate that August sales generally were much better than the previous month and from 50 to 100 per cent better than August of last year. This condition prevailed except in a few states which represented no one section of the country. Where percentages of increase were given, they ranged from 9 to 30 per cent.

There is a general feeling on the part of the dealers that the effect of price changes has been to stimulate sales of cars where there had been reductions but that the volume of sales as a whole has been retarded.

Light trucks are in much greater demand than heavy duty vehicles.

The used car market is reported as being very irregular with some dealers stating it to be good and others dull.

Excellent conditions in the agricultural and industrial fields promise fairly good prospects for fall trade, although at the same time, it is reasonable to suppose that there may be some decline in output.

The committee on simplified practice of the N. A. C. C., is actively engaged in the preparation of data looking toward standardization of parts, spark plugs, starters, roller bearings and brake linings. The motor truck committee states that it was getting inquiries from milk producers relative to the adoption

of trucks for use in shipping. If the producers ship by trucks rather than by rail, it will mean that 10,000 additional motor vehicles will be needed.

The service division has been campaigning during the summer and has distributed more than 100,000 stickers to service association members for placing on cars. In its work it has had the active cooperation of the Automotive Equipment Association with assistance

given by parts and equipment manufacturers. Inquiries relative to the formation of service associations are on the increase and the division is helping materially in carrying through programs, after formation, including the furnishing of speakers, films, and the like.

The drawing of space for both New York and Chicago shows will take place at the N. A. C. C. rooms on Thursday, Oct. 5, at 2 o'clock.

Canadian National Motor Show a Success

TORONTO, Ont., Sept. 16—The automotive industries received more attention at the recent Canadian National Exhibition than during any previous fair. This was the largest showing of cars, trucks and accessories ever made in Canada. The new cars naturally attracted more attention than those that are well known on the Canadian market. More space was available than in previous years, and

there was no vacant room in either of the two locations where automotive products were shown. The accommodation this year represented a great advance over previous shows. The amount of selling was highly satisfactory to the manufacturers of all classes of passenger cars, trucks, and accessories. As a consequence, it is conceded that production in Canadian plants will be fairly active during the balance of the year.



Transportation Building in which Canadian national automobile show was held, Aug. 26 to Sept. 11, in connection with the Canadian National Exhibition at Toronto

The Story of a Prospect Who Called At the Salesroom

This Is a True Story, Told by the President of a Prominent Corporation in Chicago, in His Own Words, of His Experience in Calling at an Automobile Salesroom

I HAD been wanting an automobile for several years, and used to go along Sheridan road and wish I had a car. I thought that I would be able to get more out of life in that way. My wife and I had read all the automobile advertisements in magazines and newspapers, and we finally decided to buy a certain car which was within our means.

"I went down to the sales agency for the car which I had decided to buy and went into the salesroom. I stepped inside, but didn't notice anyone around. In the back of the salesroom, however, a man was sitting at a desk glancing over some papers. I walked around the store, stamped my feet a little, but still nobody paid any attention to me. You know when you go to buy something, you want some personal attention without having to ask for it. Finally the man at the desk pushed aside his papers and said: 'Do you want to buy a car?'"

"No," I replied, 'I am just waiting for a friend.'

"Well make yourself at home," was the only response I received.

"I kept glancing around at his car and finally went over and began looking at it—I wanted him to sell it to me. 'Pretty nice car,' I said.

"Yes, it is," came the response from the would-be automobile salesman.

"I walked around a little while longer and finally went out of the store and walked down automobile row to the store which handled another car, my second choice. I looked in the store before I entered and saw a mighty fine, wide-awake-looking chap waiting to welcome anyone who came in. As I came into the store, he approached me and said: 'How do you do? Have you seen our latest model?'"

"I told him I had not and also assured him of the fact that I was not in the market for a car and was merely waiting for a friend.

"That's perfectly all right," he continued. 'I don't want you to buy. I just want you to see this wonderful car of ours—just from the factory. Did you ever see such lines in a car?'"

"I admitted they were very good, but was restraining my admiration and real feelings. It was a good-looking car, but I really couldn't see why he raved so much about it. But he kept right on, until I, too, soon began to see the excellence of his car. He then lifted the hood and said:

"I want you to see the engine. It has the finest power-

This article was not prepared with the thought that it would appear in an automotive publication. The big business man quoted is a customer of a sales training institution. He told this experience in the office of that institution to illustrate a point he was making as to salesmanship. The statement was then prepared for the publications of the National Salesmen Training Association. The lesson in it for automotive dealers is obvious.

plant ever put into any machine. He went on explaining the special features of the car. I again assured him that the car seemed to be all right, but that I was not interested. He didn't seem to mind that a bit and, in fact, was just as well pleased, or at least appeared to be.

"I am only too willing to show you this wonderful car of ours, because some day you may be in the market for one, and I know you will remember the car—and remember me."

"I began to look at my watch and said that I must be going, as my friend was evidently detained. "Where do you live?" asked the salesman.

"I live North."

"Well, here is some literature that will be particularly interesting to you; take it home and look it over in your spare time—no, perhaps you don't want to take it with you, so give your address to me and I will mail it to you."

"I didn't want to give him my address, so he said: 'Whom are you with?'"

"After I told him he informed me that he knew several men connected with our company. 'Say, by the way, I will take you down town,' he added.

"After assuring him that I would be very grateful to him for the favor, but that it would be impossible, inasmuch as I was going to meet a friend, he said:

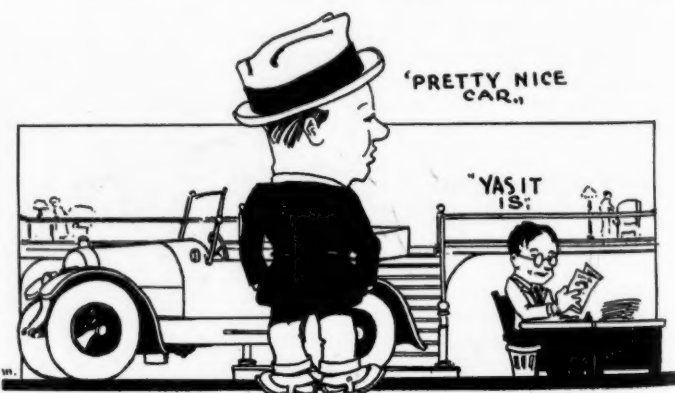
"By the way, how would you and your wife like to go for a ride some time?"

"I told him that we would like to go. He assured me that he would like to get acquainted with us—be neighborly—as we both lived on the North Side.

"That evening when I went home my wife asked me if I had bought the car of our first choice, and I told her that I had not and didn't think I would. After her question as to why, I explained to her it didn't have so good an engine.

"Several times during the next week, my automobile salesman-friend called me up at the office and wanted to drive me home. Finally, one night he did, after I couldn't gracefully get out of it any longer. All the way home that night he was extolling the unusual features of his car. I admitted to him that I had been looking at another car, and mentioned the name. I asked him his frank opinion. He told me that it was a very good car—but that he would like to show me some features in his car that excelled all other cars which sold at about the same price.

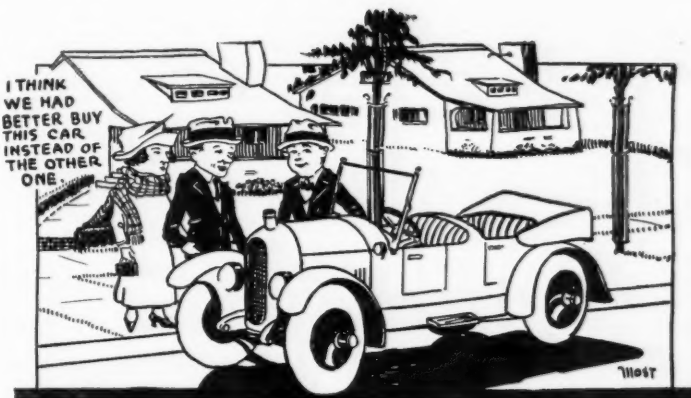
"When we reached my home, the salesman thought it would



be a very good idea to show the car to my wife and make an appointment to take us out riding some evening.

"Several evenings later, when we were returning from the ride, she 'spilled the beans.' 'I think you are right,' she said. 'I think we had better buy this car instead of the other one.' And we did.

"That fellow is a real salesman. He is the kind of man I would like to call a friend. He is a man of character. He knew his car. He fully and clearly explained it, and sold both my wife and me. He had a purpose, and he didn't let go of me until he accomplished it. He was reasonably sure that I was going to buy a car, and he was going to be the one to sell it to me. He kept right after me—paid the price and was rewarded for it."



DOING ONE THING WELL

In cleaning a spark plug, the plug should be taken apart, if it is the two piece type, so the deposit can be cleaned from the porcelain and interior of the shell. It is the oil and carbon that collects on this part of the plug which causes misfiring. The points of the plug have nothing to do with misfiring so long as there is the correct gap. A mechanic who recently cleaned a plug was very careful to polish the points, saying that to do so made it easier for the current to pass through. This is sheer folly, as the high tension current itself is a cleanser to the points.

Consider the function of the spark plug, its duty is to deliver the spark generated by the ignition device, to

highly compressed inflammable mixture in the engine cylinder. In order to ignite the gas in the cylinder it is imperative that the spark occur only at one place on the plug and that place is across the air gap between the insulated and ground electrodes of the plug, or between the plug points as they are called.

The natural air gap at the points acts as a dam for the electric spark, which has the characteristic of always seeking the easiest path. The dam effect or resistance of the air gap is not the only thing that tends to discourage the spark from jumping only at the points, there is another factor that is far more discouraging to the spark, and that is the effect of the highly compressed mixture

in the cylinder. Sixty pounds compression pressure in the cylinder means that it is six times more difficult for the spark to jump at the plug points when the plug is in the cylinder than when the plug is out in the open air.

It is for that reason that the plug manufacturer puts a long thick insulation of porcelain or mica over the center point or electrode of the spark plug. The ground point or electrode is connected to the shell of the plug and the insulation in the plug is to keep the spark from jumping to the metal shell before it gets to the points. If we make the path of the spark easier between the center electrode and the shell of the plug, than it is between the center electrode and the ground point at the end of the plug, it will jump from the center electrode to the plug shell and not at all at the plug points, when this happens the cylinder does not fire regularly.

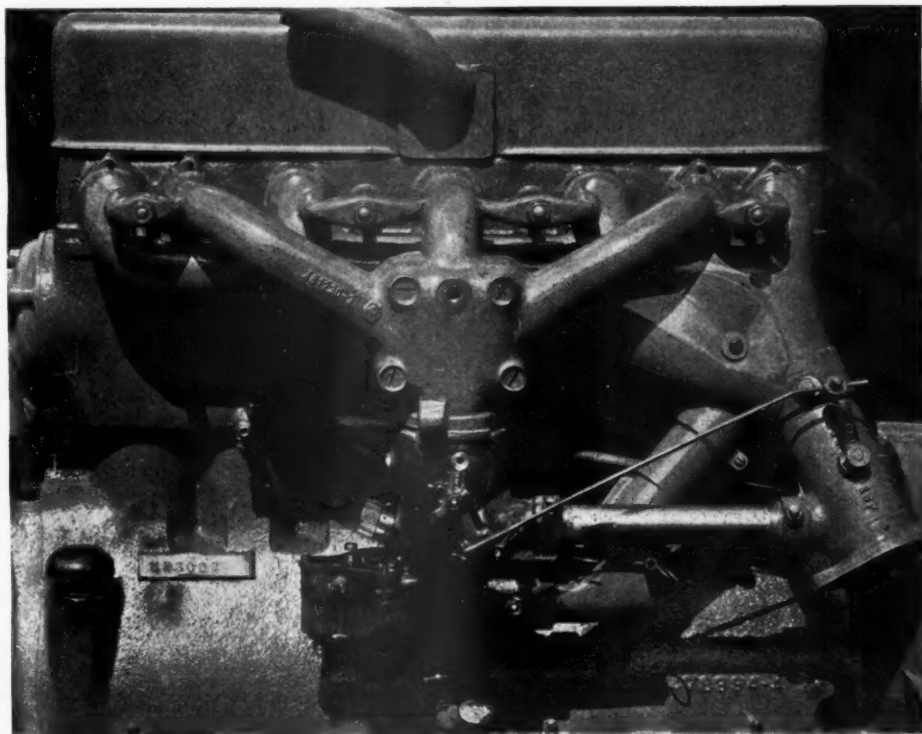
The path for the passage of the spark from center point to shell is made easier when we decrease the insulating powers of the porcelain surrounding the center point or electrode. The insulating powers are decreased mainly by a crack in the insulator or by a deposit of carbon on it.

IT IS FOR THIS REASON THAT WHEN A PLUG IS REMOVED FOR CLEANING, THE PORCELAIN OR INSULATOR SHOULD RECEIVE THE CLEANING PROCESS AND NOT THE PLUG POINTS. The insulator should be thoroughly cleaned of all gummy oil or carbon and after cleaning should be carefully examined for possible cracks. The spark plug shell should also be relieved of the carbon deposited on its inner walls. The points, if they are the proper distance apart, will require no attention.

"ROAMER" FOR "ROMER"

In a letter to the editor of MOTOR AGE, the advertising representative of the Zenith Carburetor Co. states that through an error in the copy furnished for the Zenith advertisement which appeared in MOTOR AGE for Aug. 10 the name "Roamer" was included in a list of American passenger cars which use the Zenith carburetor as standard equipment. The letter states that the advertisement should have carried the name "Romer."

New Oakland Exhaust Manifold



Carburetor side of the Oakland engine showing how the heat is taken from the exhaust manifold, forming a hot-spot at the junction of the manifold branches. Hot air also is taken from a jacket surrounding the exhaust manifold and led to the carburetor by the small horizontal pipe shown. The amount of air coming through this pipe is controlled by a valve which is connected by a small rod to the throttle operating lever. Thus, the correct amount of heat is assured for any given throttle opening, inasmuch as the mechanism works regardless of the driver's whims

Three Bearing Crankshaft New Feature of Maxwell Engine

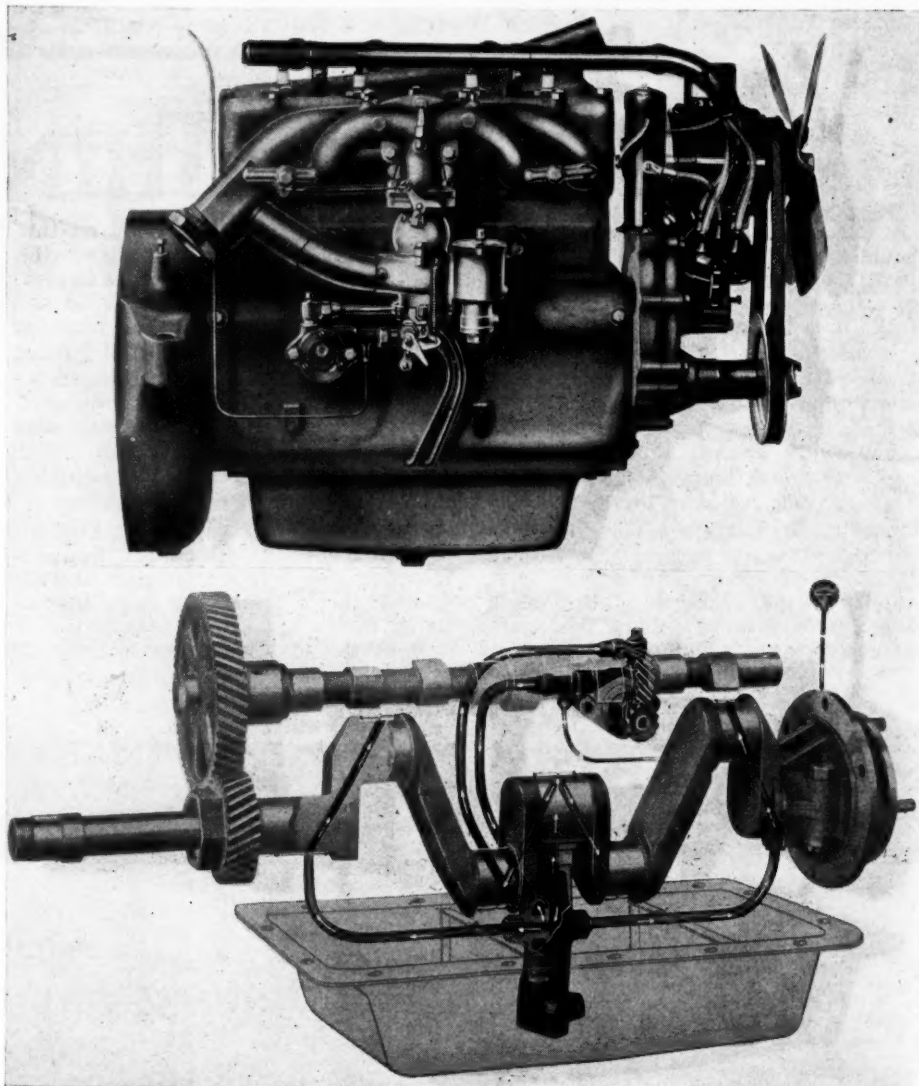
General Maxwell Design Retained. Crankcase, Bearing Mountings and Lubrication Altered

MAXWELL cars are now coming through with three-bearing crankshaft engines, in place of two. Beyond this alteration the cars are exactly the same as recently described. The three bearing crankshaft has necessarily brought with it some alterations in the crankcase and bearing mountings and on the new shaft an oil slinger ring is incorporated. The cylinder block, pistons and all of the structural parts of the engine, unaffected by the crankshaft, remain as before and the engine taken as a whole is the same product which has been developed over a long period of years for the Maxwell cars.

The new shaft is unusually heavy and consequently rigid for this size, 3 $\frac{5}{8}$ by 4 $\frac{1}{2}$ ins., engine having a center bearing diameter of 2 $\frac{1}{4}$ ins. The diameter at each end bearing is 1 $\frac{3}{8}$ ins. It is pointed out by the Maxwell engineers that this bearing length is a approximately one-third of the total length of the shaft. The overall length of the engine remains unchanged.

In connection with the new crankshaft the lubricating system has been altered to take care of the interior of the engine by full pressure through a drilled crankshaft in place of splash. The oil pump is now a gear driven type operated from the camshaft. Oil is pumped under a pressure of 10 lbs. per sq. in. at normal speeds through three large leads to the three main bearings. The front end bearing is so designed as to permit a flow of oil direct to the timing gears. Oil is also supplied to the lower connecting rod bearings through the drilled shaft and by spray from the rod ends to the pistons and other working units.

While there has been no fundamental change in the gasoline vaporizing system, the ramshorn type of manifold adopted some time ago being continued, the carburetor is now the Stewart. This is the only alteration in the exterior of



Above—Exterior of the Maxwell engine, showing the Stewart carburetor and the ramshorn manifold. The new crankshaft has not increased the overall length of the engine.

Below—Oiling of the engine is now accomplished through a drilled crankshaft. The bearing length is about one-third the length of the shaft.

the engine. The power plant is the unit type and the clutch and gearset members remain unaltered except for a dou-

ble row annular ball bearing in the rear of the transmission shaft in place of the plain bearing.

EMPIRE RUBBER CO. SOLD

TRENTON, N. J., Sept. 16—The assets of the Empire Tire & Rubber Corp., were sold by the receivers at a public sale here to Campbell, Heath & Co., of New York City for \$1,675,000. It was stated that the purchasers will form a company to operate the plant with C. Edward Murray, Jr. of this city as head of the concern.

LINCOLN RECEIVER'S REPORT

DETROIT, Sept. 18—The report of the Detroit Trust Co., receiver for the Lincoln Motor Co., for the period dating from its appointment Nov. 8, 1921, to Aug. 1, this year, shows a balance of \$5,176,119.41 remaining in its hands awaiting the outcome of the investigation of the United States Department of Jus-

tice into the affairs of the original Lincoln Motor Co.

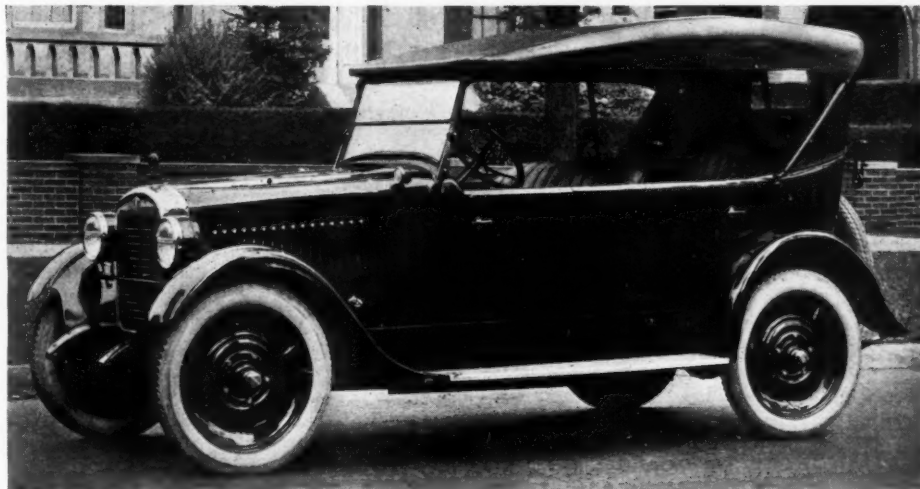
The report, filed in Federal court this city, states that the investigators of the department of justice have been housed in one of the Detroit office buildings so that there might be no interference with the operation of the Lincoln company by the Ford interests, through their presence at the Lincoln offices.

Some of the Most Recent Passenger Models

New Columbia Special Six Phaeton

NEW Columbia model known as the special six phaeton to retail at \$1095 f.o.b. Detroit has been added to the line of this concern. This body is mounted on the standard Continental 115 in. wheelbase chassis incorporating the Continental 6-Y engine, Timken axle, Durston transmission gearset with Timken bearings, Stromberg carbureter, Borg & Beck clutch, Gemmer steering gear, Spicer universal and Auto-Lite electrical equipment.

Among the features of the special six are nickel-plated Harrison radiator with thermostatically controlled shutters, cowl ventilator, barrel head lamp as well as cowl lamps for parking, heavy weight



crown fenders and cord tires. The body is of generous proportions, the rear seat

being 46 in. wide and the upholstery is of real leather over deep coiled springs.



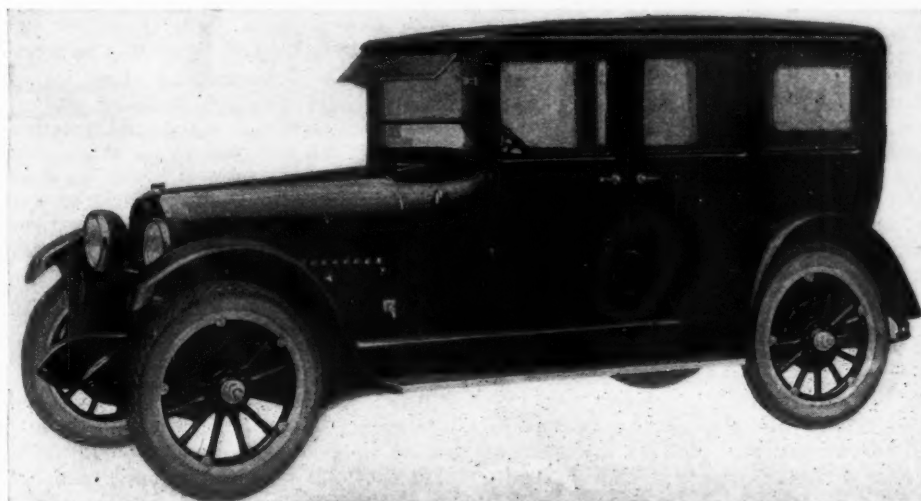
Hupp Phaeton With Special White-Hanna Sport Equipment

HUPP touring model with White-Hanna special sport equipment—full-crown fenders, individual alley steps and special frame shields. The White-Hanna Company, Detroit, is selling this special equipment through the service departments at factories and is prepared to meet the specifications of any make of car. Through the use of this equipment, factories with no regular sport models can make a sport-equipped car as optional with the dealer.

Nash Four-Door Sedan Now in Production

THE four door sedan, shown here has just gone into production at the Nash Motors Company's factory, in response to the popular demand for enclosed cars of this type. The five passenger body is mounted on a 121 in. chassis and the car is powered with a Nash six-cylinder engine.

The enclosed type of car is becoming more and more popular every day. Dealers everywhere report phenomenal sales in this department and a growing tendency on the part of buyers to believe more firmly in this type of car.



Individual Dealer Must Solve Used Car Problem, Conference Verdict

Secretaries of Chief Dealer Organizations Discuss "Plans" as Means of Educating Those Now Overbidding on Trade-Ins

By CLYDE JENNINGS

MORE than forty automobile dealer association secretaries and a dozen dealers assembled at the Congress Hotel in Chicago last Thursday and Friday to discuss the used car problem. These men had no idea that they were going to solve this problem, neither did they have any idea that a ready made solution would be found. The object of the meeting was for each secretary to get as much information as possible about the used car appraisal and selling methods in other communities than his own, so that he might submit these ideas to the dealers belonging to his association. The meeting was under the auspices of the National Association of Automobile Show and Association Managers.

Most of the associations represented at this meeting have more than 50 members. Some of them exceed a hundred. The associations represented were those which are doing the best work in the education of dealers and the raising the standard of automotive merchandising in their communities.

Three plans for handling the used car problem were submitted:

1. The central appraisal plan as presented by Morris Adler of Quincy, Ill.
2. The suggested value tabulation, used with or without other market value information. Presented by L. B. Sanders, of Boston, Mass.
3. The circulation of market value information with individual opinions as to market value of cars. Illustrated by the Chicago Automobile Trade Association Blue Book, used by many associations.

All of these plans are familiar to readers. Recent MOTOR AGE articles describing them are:

Quincy Used Car Exchange, April 17, 1922.

Saginaw Plan, March 16, 1922.

N. A. C. C. Review of the various used car plans, April 27, 1922, May 11, 1922.

Little time was given to the discussion of the actual plans of operation as most of those present were familiar with the fundamentals of this work. The meeting quickly got down to the discussion of the success of working along the so-called ready made plans.

The big idea that appeared to develop in the discussion, which was participated in by practically all present, was that the former effort of lining up dealers for or against any plan by a system of fines or other penalties was basically wrong and no one had a grievance

against the federal or state laws that prohibited enforcement of such a plan. The idea of the secretaries was that the use of any plan was educative and that the dealer who did not conform to suggestions for buying used cars, at values somewhat in keeping with market prices of these cars, would be penalized by his personal losses when he was forced to dispose of the used cars that he had accumulated at prices that were out of line.

B. B. Burns, president of the Illinois Automotive Trades Assn., who has never sold a new car and who buys from dealers and owners and reconditions and equips cars and then sells them as "Burns Cars" under such guarantee as they justify, says, "I consider used car sales under these conditions just as dignified and just as legitimate as new car sales."

The value of the used car plan and its being made the subject of frequent and perhaps constant discussion at weekly meetings of dealers was stated to be that it kept the subject of the relation of supply and demand for used cars uppermost in the minds of the dealers and, when they were called upon to write off the used car losses, it would bring home to them that they had been price cutting their new cars to this extent, rather than merely taking trade-ins on the cars they were selling.

Adler, in his description of the Quincy Used Car Exchange added little except recent history to the description appearing in MOTOR AGE. It was brought out that fewer dealers were using this exchange now, because some of the members of the Quincy Association feared that to accept the appraisals of the exchange manager was restricting their opportunity for new car sales. Also, that it was necessary to wait 60 to 120 days for the money for the used car from the Exchange, and if they retained the car for direct sale, they could get the money in less time. Some of the members there much preferred the immediate cash with a loss, to waiting for the necessary period for the higher price from the Exchange.

Adler made no pretense that the Quincy Exchange had been able to hold all of the members in line on the idea that they did not deal in used cars but that the Exchange did. In answer to

questions regarding infractions of actually allowing the customer more than the Exchange appraisal, he said, "As the dealers in Quincy are human, I suppose they do violate the agreement, but as the Exchange does in its way, it is bringing this question home to dealers."

However, the Quincy Exchange has been so successful in the eyes of the 10 or more dealers who have stuck to it that they have recently signed a lease for a remodeled building at a higher price.

Sanders' description of the workings of the Saginaw plan, as modified for Boston and as it is now extending throughout New England by force of the good it is doing, was the most extended discussion of the meeting. The maximum estimates of used car value by years and models, supplied by the Boston Used Car Statistical Bureau to its subscribers, are the result of market experience.

Originally the values for a particular car were suggested by the dealers handling that car in Boston and environs. These suggestions were discussed by a committee representing the bureau and revised as found necessary in the light of the ability of other dealers to sell this particular car. Later, as the reports of the sales of these cars were accumulated from the reports of the member dealers, the market value was automatically fixed by supply, demand and local appreciation of the car.

Sanders uses two guides for his estimates or suggested prices for used cars. First, is the Blue Book, which supplies national prices as reported by many dealers. Second, the reports from the members of the bureau, based on actual sales and closely checked for accuracy. The suggested prices are printed in loose leaf form for a small pocketbook which is sold to dealers in any quantity for the use of the salesmen and others concerned in the buying of used cars.

A very high value is placed on the national reports as supporting the locality reports. Much of the best work done by this bureau, has been the bringing of the subject of used car losses home to the dealers, through the reports of the prices of cars bought and sold, with accurate figures as to the loss to the community of dealers. Sanders figures indicated that there had been a loss of \$600,000 to Boston dealers last year and a loss to the dealers of the country of \$233,000,000.

Sanders said that the public must not

be blamed too much for the present attitude toward used cars, as it had been taught by the dealers operating for the last several years to expect competitive bidding for wrecks of cars when the owners of the said wrecks were ready to buy a new car. He stated quite strongly that after many years' experience as a dealer and several months' experience in association work, devoted entirely to used car work, that there was no wholesale plan of solving the used car problem, but that the solution would have to be reached in the individual establishment of each dealer. He told of recently being called to address a gathering of dealers and he found there the vice-president of a car manufacturing company. He went ahead with his usual dealer talk, explaining what the Statistical Bureau had done and why and later the manufacturer was called upon. This man said in effect:

"There is no used car problem if the dealer has a sufficient knowledge of his own business to refuse to undertake to sell more cars than can be absorbed in his community."

The question to Sanders of how "trading allowances," granted by the factories, were handled brought out some of the sharpest discussion of the meeting. Sanders stated that the dealers who were leading the Statistical Bureau movement in Boston had persuaded the members there to report when a trading allowance was granted them by the factories and that, in the reports of these allowances, they had information as to exactly what models were affected.

Twenty-eight such allowances had been reported during the life of the Bureau. In some cases, the dealer had been prevailed upon to use this allowance as a cut price on the merchandise, rather than on increased price of the used car taken in trade. This had been done exactly on the basis that other lines of merchandise were reduced in price, because the model was being discontinued.

Saginaw Used Car Plan

A high point in accomplishment was reported by C. J. Arnold, used car manager for the Garber-Buick Co., of Saginaw, Mich., who talked on that plan. The Saginaw Association has had weekly used car meetings for seven years and Arnold said that he believed the situation was much more easily handled now than at any previous time during the seven years due to the fact that the members were appreciative of the results accomplished. As a climax of his remarks, he said:

"It has become a practice among the dealers in Saginaw to exchange their used cars back to the dealers, who handle the line as a new car. If a Buick dealer took in a Paige car, the chances are that he would trade the used Paige to the Paige dealer for a used Buick that the latter had taken in.

"The object in this, is to give to the new car dealer the control of the used cars of his line and a recognition of the fact that a dealer could recondition a car of his own line better than a dealer whose shop was equipped and trained

for another make of car."

The selling of used cars was the topic for the second session. Two practices were reported upon and they came from the opposite ends of used car selling problem.

B. B. Burns, president of the Illinois Automotive Trade Association, a used car dealer who has never sold a new car, described how he bought cars from dealers, owners, estates and other sources, reconditioned them in his own shop even to the extent of renewing the cylinders, nearly always painting them, changing roadsters and small phaetons into speedsters, dolling them up with side windshields and other visible equipment and selling them as "Burns cars" under such guarantee as he thought the car justified. Burns has prospered and he said that he considered used car merchandising under these circumstances just as dignified and just as legitimate as new sales. His salesmen are carefully trained and his advertising is guarded carefully against over statements.

Those present realized that Burns' type of business was a far cry from the usual type of used car dealer and they plied him with questions. It was in answer to these that Burns made two interesting statements:

Calls Used Cars Best Buy

That under proper conditions of reconditioning, he thought that many of the used cars were a better buy for transportation, social features included, than new cars. He thought that the proper type of used car dealer could keep many cars in satisfactory operation and avoid the loss of wrecking the car because of some defect.

Following Burns, S. E. Comstock, vice-president of Williams & Hastings, Hupmobile distributors in Detroit, and in charge of used car sales told of a plan being inaugurated by that company. The 11 community dealers in Detroit have been brought into this arrangement and these dealers will join in advertising such used cars as they may have. This company does not recondition the cars to the extent practiced by Burns, but carefully inspects all cars, makes such adjustments as may be necessary to put them in running condition and will then offer the best of these for sale as "Gold Seal Cars." This Gold Seal trademark has been adopted by the Hupp organization in Detroit as sort of a guarantee of used cars handled by these associated

These successful used car sellers, however, differed in one point, chiefly because of their far different position in the business. Comstock took the position that a used car would always be a price proposition, which is natural for the man who is selling news car to take. Burns' view is that the used car can be sold because of condition and appearance, without a direct reference to its being cheap. The difference is more a matter of method than actual practice.

At the conclusion of the used car discussion, it was voted that a committee be named to prepare a used car manual containing many of the forms and sug-

gestions made at the meeting. Robert E. Lee, who presided, named this committee: Herbert Buchman of Cleveland, L. B. Sanders of Boston and Neil G. Adair of Motor World, secretary of the association.

Further suggestions taken up at the meeting included a proposal for an Association of Associations (confined to automotive dealers' associations) suggested by John E. Raine of Baltimore and C. H. Warrington of Washington. After much discussion, during which C. A. Vane of the National Automobile Dealers' Association, explained the objectives of that association, action was postponed until the January meeting.

The subject of How to Sell More cars at the Shows became an animated exchange of advertising ideas for shows and better salesmanship at the shows. Timothy D. Beard reported that the plan used last year of specially training salesmen for the show and a system of daily prizes for the man most attentive, was regarded as having been entirely successful. The value of newspaper advertising, dodgers, borrowed window displays, and other materials, was gone into in detail.

The associations represented were:

Registration of National Used Car Conference

Binghamton Automobile Dealers' Assn.,
E. D. Deane, Sec'y., Binghamton, N. Y.
Brooklyn Motor Vehicle Dealers' Assn.,
Ralph Ebbert, Brooklyn, N. Y.
Buffalo Automobile Dealers' Assn.,
C. B. Proctor, Sec'y., Buffalo, N. Y.
Cleveland Automobile Dealers' Assn.,
Herbert Buchman, Mgr., Cleveland, O.
Detroit Automobile Dealers' Assn.,
H. H. Shuart, Mr., Detroit, Mich.
Grand Rapids Automobile Dealers' Assn.,
M. Elgin, Sec'y., Grand Rapids, Mich.
Jacksonville Automobile Dealers' Assn.,
E. S. Bond, Sec'y., Jacksonville, Fla.
Kansas City Motor Dealers' Assn.,
Geo. A. Bond, Sec'y., Kansas City, Mo.
Louisville Automobile Dealers' Assn.,
Geo. T. Holmes, Sec'y., Louisville, Ky.
National Automobile Dealers' Assn.,
C. A. Vane, Mgr., St. Louis, Mo.
St. Louis Automobile Dealers' Assn.,
Robert E. Lee, Mgr., St. Louis, Mo.
Springfield Automotive Dealers' Assn.,
Harry W. Stacy, Sec'y., Springfield, Mass.
Syracuse Automobile Dealers' Assn.,
H. H. H. Smith, Sec'y., Syracuse, N. Y.
Utica Motor Dealers' Assn.,
W. I. Love, Utica, N. Y.
Wilkes-Barre Automobile Dealers' Assn.,
Norman Johnstone, Sec'y., Wilkes-Barre, Pa.
Baltimore Auto Trades Assn.,
John E. Raine, Sec'y., Baltimore, Md.
Chicago Auto Trades Assn.,
Timothy D. Beard, Sec'y., Chicago, Ill.
Indianapolis Auto Trades Assn.,
John Orman, Mgr., Indianapolis, Ind.
Michigan Auto Trades Assn.,
W. D. Edenburn, Mgr., Detroit, Mich.
Milwaukee Auto Trades Assn.,
B. J. Ruddell, Sec'y., Milwaukee, Wis.
Philadelphia Auto Trades Assn.,
C. C. Bulkeley, Sec'y., Philadelphia, Pa.
Springfield Auto Trades Assn.,
W. F. Townsley, Sec'y., Springfield, O.
Toledo Auto Trades Assn.,
T. J. Cooper, Sec'y., Toledo, Ohio.
Washington Auto Trades Assn.,
C. H. Warrington, Pres., Washington, D. C.
Automotive Equipment Assn.,
Ray W. Sherman, Chicago, Ill.
Nat'l. Institute of Progressive Farming,
Guy H. Hall, Director, Chicago, Ill.
Boston Used Car Statistical Bureau,
L. B. Sanders, Sec'y., Boston, Mass.
Burns Used Car Dealer,
B. B. Burns, Decatur, Ill.

Parts Makers Hear of Great Automotive Market of Future

Speakers Tell M. A. M. A. Members Production Must Increase and Ask Wider Sale of Parts Through Jobbers

By C. G. SINSABAUGH

News Editor The Class Journal Co.

A BRIGHT outlook for the immediate future of the automobile industry, with prosperity extending throughout 1923, was predicted at the sixth annual credit convention of the Motor and Accessories Manufacturers' Association, held in Buffalo, Wednesday, Thursday and Friday of last week. Ostensibly a meeting of parts manufacturers as represented by the heads of their credit, traffic, export and advertising departments, yet it really was a general symposium of the entire automotive industry in which the dealer and the jobber although not directly represented, came in for a deal of attention.

A good fall business, with enough cars manufactured and shipped to supply the demands of the dealers even if there is a transportation tangle and a shortage of coal, was promised, while indications point to 1923 being the bumper year of the industry, not only in car production, but in general prosperity as well. Enclosed cars are going to be in even greater demand and the replacement business is going to be much greater than ever. Throughout all the sessions, however, the use car loomed up as the one menace to the industry, a problem that will not down, and which is worrying not only the automobile manufacturers but the parts people as well, who feel the pinch in the reconditioning of these second-hand machines.

Record Production Interpreted

It was Alfred Reeves, general manager of the National Automobile Chamber of Commerce, talking to the credit men, who interpreted the record breaking production of the past four months. Reeves declared that the car makers took Hoover's tip of an approaching coal strike, made last March, and planned a big production this summer in order to anticipate the expected trouble, which materialized. During the first eight months of this year the industry has made 1,664,000 motor vehicles, which is practically equal to the full year's production of 1921. August produced 272,000 and while all of these have not been sold, they have been shipped and the dealers throughout the country will have on hand cars enough to meet the anticipated demand, even if transportation falls down and coal is hard to get this fall.

Reeves looks for a substantial slowing up in production in September, because

of the activities of May, June, July and August, but he feels that this let-up will not be as great as ordinarily might be expected, because the farmer will come into the market this fall with money for cars, while the demand for enclosed cars is expected to be heavy.

Big Output Predicted

Reeves predicts that the 1922 output will total 2,100,000, with 30 per cent enclosed cars. In 1923 he thinks production will go to 2,300,000 of which 1,750,000 will take the place of cars already in use. Two years from now he looks for 50 per cent of the production being enclosed cars.

The used car situation will be worse this fall, Reeves thinks, and he can see no cure for it, at the present time. He expressed the belief that second-hand trucks never should be taken in trade—they should be kept running until they wear out.

Others than Reeves pointed out the dangerous menace of the used car. In a telegram to the convention, R. H. Collins, president of the Peerless Motor Car Co., said he would have no hesitancy in predicting an even greater general prosperity in the future "if it were not for the one fatal menace which threatens the industry today, namely, the growing tendency of automobile distributors and dealers to place an exorbitant value on cars accepted in trade and to over-estimate their ability to dispose of these cars at their fabulous prices. If this condition continues, the resultant suffering must be shared by the entire trade, including motor and accessory manufacturers and dealers, as well as automobile manufacturers and distributors."

The credit men, too, pointed out the danger from their viewpoint. In the general discussion the first day of the convention, attention was called to the vast numbers of used cars offered for sale on the open lots in the larger cities. It was said that in Cleveland alone, 30,000 of these used cars were sold at open air sales this year.

From the dealers' viewpoint, this activity is to be commended perhaps, but the credit men pointed out that in most cases too high prices are allowed when the cars are taken in, in trade, so that the dealer cannot spend much in reconditioning them. In some cases, they do not attempt to recondition, selling them "as is," the result being a dissatisfied

buyer who always will fight shy of the used car afterwards.

"The result of this is that we are called on for such cheap replacement units that we cannot meet the demand," said one of the parts makers. "I find, for instance, that they want a storage battery for reconditioning a used car that will not cost more than \$5. I know a piston ring maker who has been forced to bring out a line of cheap piston rings simply to meet this used car demand."

"The Financial Outlook and An Outside View of the Automotive Industry," was the subject allotted to Merryle S. Rukeyser, financial and business editor of the New York Tribune, who was the principal speaker at the opening session of the convention on Wednesday.

Better Financial Conditions

"Next year's automobile business ought to be satisfactory," said this financial critic. "In most respects, the factors which can be foreseen must be placed on the asset side. The main exception is the fact that part of the 1922 buying, which resulted during several months in the breaking of all previous production records, was due to the accumulated demand which had become pent up during the depression of the latter part of 1920 and of 1921. On the side of favorable influences, most of them can be expressed in the phrase—better general financial and industrial condition."

"It does not take a soothsayer to know that business is on the upgrade. In many industries the revival has been going on slowly, almost imperceptibly for a year. Although I do not pretend to be able to predict regarding the future, I nevertheless see no reason, financial or economic, for assuming that the recovery has gone as far as it will go. On the contrary, the predominant Wall Street opinion is that the revival will go substantially further."

"We seem to be facing better business conditions and, since industries are interdependent, the automotive industry ought to reflect in full measure the return to more prosperous trade conditions. In the next phase of the business cycle, which I think we are soon to enter. A period of heightened buying, accompanied by business obtained on a basis more profitable to the seller, may be expected."

As if bearing Rukeyser out in his pre-

dictions of better business, there were a number of telegrams received from various automobile manufacturers, which were sent to the convention. In addition to the one from Mr. Collins, quoted above, messages were received from J. J. Cole, E. S. Jordan, C. W. Nash, A. R. Erskine, Windsor T. White, T. R. Lip-pard, H. H. Hills and others. Erskine wired, from the Studebaker factory:

Manufacturers Optimistic

"The automobile business has held up remarkably well in the third quarter of this year. My judgment is that it will slacken up 40 per cent in the fourth quarter but next year, commencing with the national automobile shows, will be the biggest the industry, experienced.

E. S. Jordan, president Jordan Motor Car Co.: "May I serve notice through your organization that, beginning Jan. 1, I will predict a great shortage of motor cars in the spring. The prophecy will be just as safe as that night follows day. Here is the reason: There are only a few manufacturers and dealers in this business who are smart enough to know that if you expect to have merchandise to sell when it is in demand, you must build a few days or a few weeks ahead before you may expect to deliver it. Those manufacturers who follow the policy of keeping production up during the winter will always lead. We look for a substantial enclosed car business through the winter and the biggest demand you ever saw beginning with the New York shows."

C. W. Nash, president Nash Motors Co.: "It appears to me that the prophecies made more than a year ago that business would gradually but surely improve to the point of having very prosperous times are rapidly being brought about. Barring the railroad and coal situations, I can see nothing to prevent 1923 being a splendid year in all lines of business. This is a time when courage and foresight should be used to the limit. If this is done nothing but good results, in my judgment, will follow."

Importance of the dealer in the sale of automotive products was stressed at the session of the advertising managers' conference. The subject came up in a round table discussion on "My Best Bet for Getting More Returns from the Advertising Dollar," lead by S. E. Baldwin, advertising manager of the Willard Storage Battery Co.

Baldwin declared the only way to sell the consumer successfully, is by first selling the dealer thoroughly. "He is the fellow we must think about and concentrate upon," Baldwin said. "Up to this time, the industry has been coming up hill without any effort on its own part and we haven't had to sell. The time is near when we shall have to sell as we never sold before if we are going to move our products. We must get the dealer to work with us intelligently or we can't make good. We must sell the dealer our advertising with the purpose and reason back of it."

Harry Tipper, business manager of Automotive Industries, asserted that undue

importance had been attached to the direct acceptance of advertised products by the consumer. The average individual is not impressed by more than one one-hundredth of one per cent of the attempts made to reach him, he said. The great point is that attempts to advertise to the dealer have been much less effective than they should have been. This advertising, generally speaking, has not been sufficiently informative.

The point was made by Tipper that while dealers stock a great many lines, they sell comparatively few of them and concentrate on those things in which they believe personally. He said that the active flow of authority must be from the informed to the uninformed and not the reverse.

Tipper paid tribute to the men who sell the automotive products at retail. He declared that considering the comparatively few years since quantity demand for these products became apparent, the strength of the dealer organizations which have been built up was little short of remarkable. While there are thousands of changes every year, no branch of the industry has become stabilized and the dealers are doing exceedingly well in view of the limited amount of educational effort which has been profitable up to this time.

Alfred Reeves, general manager of the N. A. C. C., also paid tribute to the dealers of the industry. He said advertising must be designed in such a way that it will attract dealer interest. Automotive advertising copy is much better, in his opinion, than it was a few years ago and it is improving steadily. It must have news value if it is to appeal. Reeves asserted that considering the age of the industry and the growth it has attained, the dealers are a very wonderful lot of men. He pointed out that much of the advertising that has been done, up to this time, has been over the heads of the dealers and that it should be more or less elementary in character.

Importance of Dealers

Baldwin explained that nothing was farther from his mind than criticism of the dealers. They have done a great work but they need help in getting the most out of their work.

"The dealer needs all the help he can get," Baldwin said, "but so do all of us for that matter. We are facing problems we never met before and we must help each other as much as we can."

He advised advertising managers to go out and live with their dealers as much as possible, for only in that way can they learn how to give them the greatest help in meeting their difficulties.

Harry Horning of the Waukesha Motor Co., expressed the view that automotive manufacturers are getting their message to dealers in an inefficient way. His chief complaint against automotive advertising is the number of meaningless adjectives and superlatives it includes. He cited Lincoln's Gettysburg address as a model of conciseness and effectiveness. Horning declared the character of the

dealer is what sells goods. He is the one who must build up confidence in the products of the advertisers. Manufacturers would do well, in his opinion, to think vastly more of selling the dealer and much less of selling the consumer.

R. E. McKenzie, advertising manager of the Timken Roller Bearing Co., said he did not believe the average owner of a motor car cared anything about the brand of bearings used in the car. The only reason for advertising to the public is as a means to an end and should not be designed exclusively for the sale of the product. He explained that it is necessary to sell engineers, and selling them is made easier if they think the user knows about the products they are being asked to buy. He believes that it is necessary to have trade paper and consumer advertising go together to form a background for each other.

Statistics Interesting

Statistical information given by Harry Tipper, business manager of Automotive Industries, proved interesting:

"In 1925 the production of motor vehicles will probably reach approximately 2,400,000 and the registration will reach approximately 14,500,000," predicted Tipper. "The curve of production is considerably sharper than the curve of registration and this arises from the changing relation between the new market and the replacement requirements."

C. A. Musselman, general manager of the Chilton Co., declared that the automotive industry is the greatest manufacturing industry in the country, with a volume this year of \$2,065,000,000. Petroleum products, of which 45 per cent are automotive, come next, with \$2,050,000,000, and iron and steel, which are generally supposed to rank first, really rank sixth, with \$1,650,000,000.

He said that the turning point in the industry has been reached and that the industry no longer looks to new owners to attain the greatest volume of sales. Until 1922 the majority of cars turned out by the car manufacturers went to new owners, but this year the ratio has changed and for every two cars that go to new owners, three go to old cutomers to replace those that are scrapped. He said the average amount of business per service station has grown from 142 cars in 1919 to 177 cars this year.

That the credit men of the parts business look with favor on the jobber was attested to in the speech of T. E. Challenger, credit manager of the McCord Manufacturing Co.

"When it comes to food products and some of the other necessities of life, I agree—and from the buyer's standpoint, mind you—that there should be practically an unbroken line from the producer to the consumer, or at least to his retailer," said Mr. Challenger. "From an economic standpoint alone this would be ideal and, I believe, more or less feasible. But with respect to countless thousands of other classes of manufactured products I very thoroughly and honestly believe that the so-called middleman or jobber, whom some are pleased to call

(Continued on page 24)

Installing Aviation Engine in Automobile Chassis

General instructions for installing aviation engines in two representative automobile chassis. Importance of securing proper suspension of engine in frame. Rear axle ratio requirements

By PAUL DUMAS

THE adaption of airplane engines to automobile use has become quite popular among those who love the touch of individuality, power and speed which such an engine gives to the chassis on which it has been installed. Many such cars are running today and there is developing an established practice for this work.

The surplus war materials placed on the public market and the curtailment of aviation activity in official establishments have made many of the aviation engines available to buyers at remarkably low prices, original cost considered. Questions are received almost daily by MOTOR AGE from men who are installing such engines and are stuck at some particular point. These questions indicate that the problems of installation are of general interest in the maintenance industry. That is the reason for the publication of the following directions for stalling a Curtiss O.X. 5—90 hp. eight cyl. vee type engine. The practice here described will apply generally to all automobile chassis and should be helpful in the installation of any high powered engine.

Dimensional Drawing Provides a Ready Reference When Planning an Installation

The dimensional cut of the OX5 engine shown in fig. 4, will be constantly required for reference and, although some of the distances are not dimensioned, the cut is to exact scale, so that scaling with the ruler will give close results. The first step will be to secure the necessary measurements of the chassis available and then lay out these dimensions on a piece of drawing paper or, if plenty of room is available, the old method of marking the chassis dimensions on a smooth floor can be followed. If the latter method is used it is advisable to make the floor layout to full size. The layout should be made in plan and elevation. When the layout or sketch with dimensions of the available chassis has been completed the constructor should have recourse to the OX5 dimensional drawing to determine whether:

1. The engine can be installed with the regular exhaust manifolds which, of course, take up some room sideways.
2. There is sufficient room to allow for installation of the OX5 hand crank, which will take up some room forward.
3. Location of cross members is such that they will not require relocating and whether relocation can be accomplished if necessary to accommodate for change in cen-

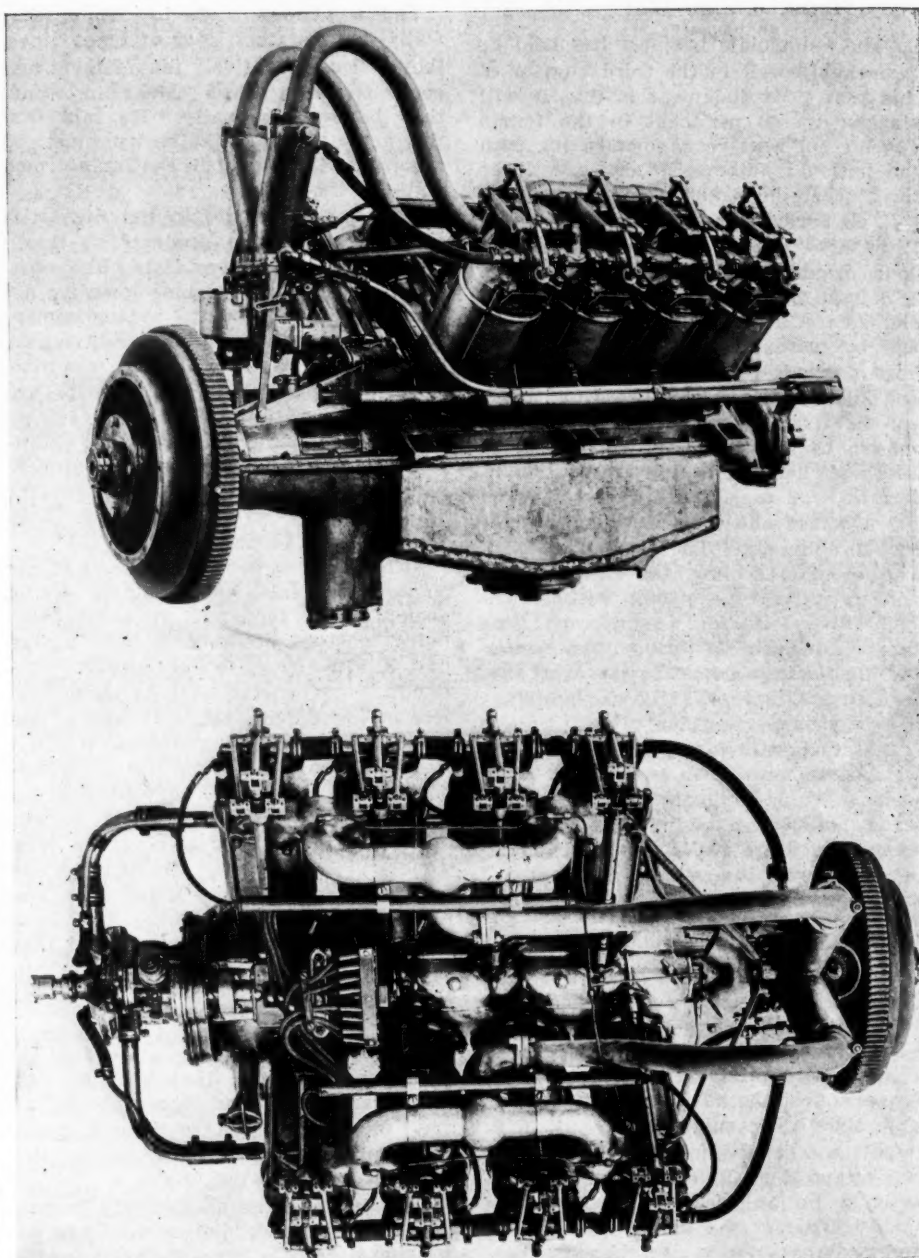


Fig. 1. Two views of engine just previous to installation in the 1910 Winton chassis. Depth of crankcase has been decreased by cutting and rewelding. The oil pump distance, measured vertically from center line of engine, remains unchanged. Using this type of manifolding it is necessary to support carbureter with strap or angle iron uprights fastened to engine crankcase as shown

ter line of engine block and clutch face.

4. Location of dash or possibility of relocating if necessary and height above ground obtainable, with respect to radiator.

5. Location of and possible interference of steering knuckle with engine bearers or part of engine crankcase.

In respect to considerations 3-4 and 5 it should be remembered that the chassis frame should be practically rigid in itself and that the OX crankcase should not be called on to take any strains except those incidental to the torque of the moving parts of the engine and the reaction of the reciprocating strains for which the six lug crankcase was designed. Where the chassis frame

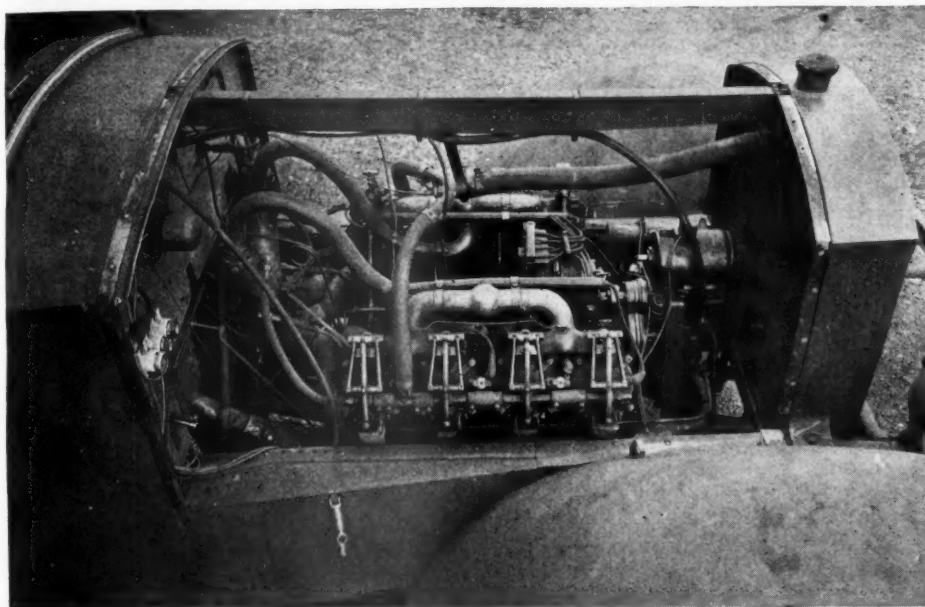


Fig. 2. Installation in the Winton chassis. Generator for lights is mounted forward, and driven from an extension on the water pump shaft

is not particularly rigid it is advisable not to attempt the installation unless a three point suspension of the engine can be designed and utilized. The installations made by the Curtiss Co. were all of the rigid type of suspension because the frames of the chassis were unusually rigid and stiff.

The design of a three point suspension can not be suggested specifically, because of the great variation encountered in the details of the various chassis. In working out a method for supporting the engine at three points it should be remembered that the rigid anchorage should preferably be at the rear. It is advisable to construct the mounting of channel section steel about 2 in. wide, of 3/16 material. A general idea of such a mounting can be secured from illustration fig. 5.

The opinion of the builders is that this is expensive and unnecessary, although the benefits to be gained from such construction can not be denied.

The Curtiss method where the frame is of very rigid construction is as follows: Two engine bearers, running fore and aft from near the flywheel to the starting crank bracket, are bolted rigidly to the engine frame side rail. They should be made of channel section as deep as possible (not less than 3 in. if the supports are 36 in. apart) and about 2 in. wide, of 3/16 in. material, and should be so placed as to allow about an 1/4 in. thick strip of hard fibre between them and the alloy lugs of the engine crankcase. Spacers made of water pipe or seamless tubing are inserted to prevent the channel from buckling when the bolts are pulled tight. Steel or brass shims are used to get proper alignment of crankshaft in relation to transmission drive shaft. After removal of the old engine from the frame, particular search should be made for loose rivets and rust streaks denoting move-

ment with respect to one another of the members of the frame itself.

Different Gear Ratios Are Necessary to Accommodate for the Low Speed of Engine

The OX engine has widely different power characteristics compared with the average automobile engine and will consequently require widely different rear axle gear ratios if the full benefits of the engine's power are to be utilized. To secure flexibility the most efficient gear ratio will also depend in some measure on the type of transmission. The following ratios are suggested as being suitable for average conditions, the lower ratio being used where maximum speed is de-

sired and the high ratio where maximum power is to be attained.

If a 4 speed transmission, high should be not greater than from 2.25 to 1, which will give maximum power, or less than 2 to 1, which will give maximum speed.

If a 3 speed transmission high should be not greater than 2.75 to 1 for maximum power and not less than 2 in. to 1 for maximum speed. These ratios, of course, pertain to the rear axle pinion to ring gear teeth ratios.

All transmission gears, bearings and wheel spokes should be in good condition to take the added torque. To secure sufficient ground clearance it may be necessary to decrease the depth of the crankcase by cutting a strip out of it, and rewelding. Not more than three inches should be removed and the oil pump distance from the center line of engine should not be disturbed.

Selection of a Suitable Flywheel

When laying out the cross member locations, in plan and elevation, it should be kept in mind that a flywheel of the largest diameter is desirable for installation on this engine. The inertia effect required from the flywheel for the OX engine is not as high as for the automobile engine, so that ordinarily a lighter flywheel would be required and, perhaps, one having less diameter. But if a starter is to be installed the largest diameter flywheel possible to install should be utilized in order to secure a high reduction for the starting motor, which will be called on to exert more torque for the higher powered engine.

If the flywheel is 16 in. diameter it should weigh not more than 70 lbs.

If the flywheel selected is 20 in. diameter it should weigh not more than 50 lbs.

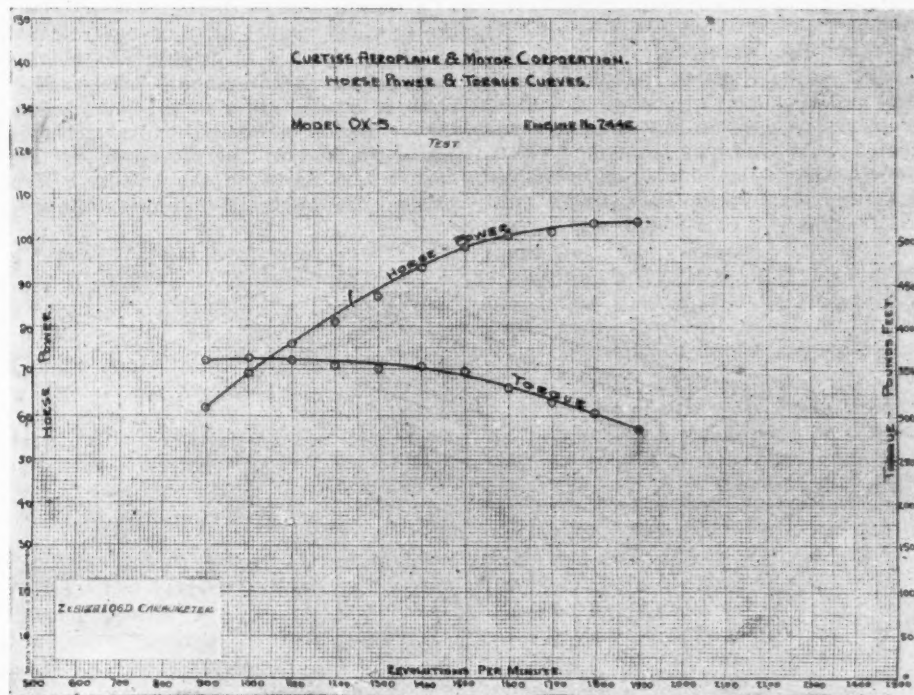


Fig. 3. Horsepower and torque characteristics of the OX5 engine. The curves are not plotted for engine speeds below 900 r.p.m.

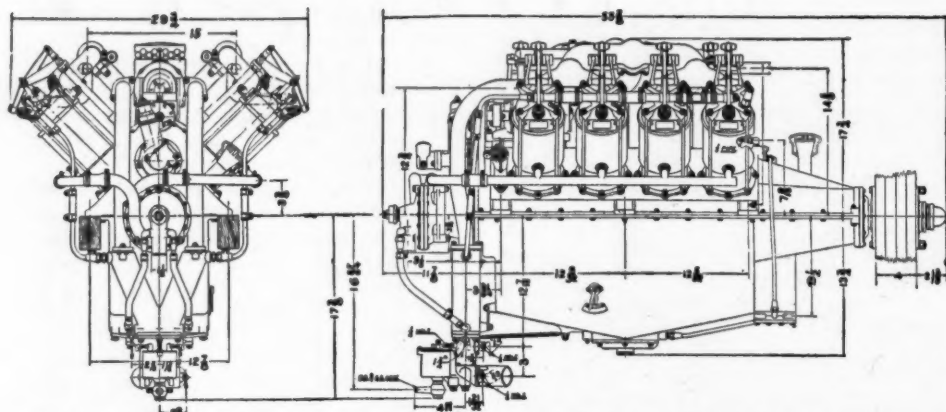


Fig. 4. Dimensional drawing of the OX engine. Practically all distances are dimensioned but where they are not given scaling will give very close results. The combination air pump and tachometer drive can be seen in the left hand figure mounted above the water pump

Starting Motor and Generator Drive and Installation

Starting motor and generator brackets should be mounted or supported from the engine bearers, or parts of the frame, or both. If three point suspension is used the bracket may be mounted on the crankcase, if not it must be mounted as stated above. Mounting of the starting motor and generator, as done on the Winton installation shown in fig. 2, has given very satisfactory results, particularly so when a long water pump shaft was used and the pump was well packed against water leaks. This method of installation allows for installation of a fan on the generator shaft if required. The photograph does not show clearly the mounting of the starter in the Winton chassis, but it may be stated that the starter is anchored by a bracket bolted to the frame, the upper portion of the starter being visible at the rear of the engine on the left side. The Marmon installation is shown in fig.

Twelve volt starting and lighting is desirable in many respects, although it has also some disadvantages. It permits of a high torque starting motor without great bulk, but the 12 volt system is used on only a few cars, so that the maintenance of the system may be slightly more difficult from a standpoint of batteries, lamps and repair parts than the six volt

system. The Westinghouse starting motor frame No. 780, as used on the Pierce-Arrow and Locomobile, is a six volt machine that possesses 17 lbs. feet torque at the armature shaft which, provided that a suitable reduction is used, is of sufficient capacity to handle the engine. If the six volt system is to be installed the generator should be driven at a slightly higher speed at 1000 r.p.m. of the Curtiss engine than it was driven on the ordinary automobile engine at 2000 r.p.m. or, in other words, the generator should be driven at about twice the crankshaft speed when applied to the Curtiss OX engine. The most efficient gear ratio for the generator, of course, depends on the characteristics of the particular generator and we would suggest that the advice of a competent electric service man be secured where there is any doubt as to the proper ratio of generator to crankshaft speed. The Winton and Marmon installations have the brushes set for maximum output at a car speed of approximately 25 miles per hour.

It should also be borne in mind that the flywheel should have as many teeth on its periphery as possible to obtain and that the Bendix should have as few teeth as possible to obtain. The greater the reduction between Bendix and flywheel the less will be the strain on the starter and drain on the battery. The photograph of the Winton installation

shows the Bosch electrical equipment, which has given satisfaction. The Bendix on the Bosch starter for this job has 11 teeth and the flywheel 135 teeth, the generator sprocket has 30 teeth and the driven gear of the generator shaft 15 teeth.

The drive from the 30 toothed sprocket to the generator sprocket is through a $\frac{5}{8}$ in. Link Belt chain, which, being located vertically, does not put undue strain on the water pump bearings. The Bosch generator is a 12 volt type and generates 8 amperes at 600 r.p.m. of the engine and cuts out at the same speed. For winter use the brushes are moved to secure an output of 12 amperes at 600 r.p.m. of the engine, to take care of the extra demands made on the battery during that part of the year. Bosch booster coils for use with the Berling magneto, for boosting or easier starting, can be secured from the American Bosch Magneto Co., the coil to be purchased is known as the model V.D.

Carburetion

Regarding the carburetor location, that shown on the Winton, is the cheapest and as good as any except from the standpoint of appearance. If it is intended to locate the generator in the vee of the engine the installation as shown on the Marmon engine may be better. When laying out the carburetor control valves it may be necessary to reverse the spring on the throttle valve to secure proper operation. See that the altitude valves close tightly if you expect easy starting. The use of the altitude control during long drives, or under varying atmospheric conditions, may bring about better gas economy. Hook up the butterfly air control and use it as a choke, as well as adjuster when engine is cold. Put a big strainer of 100 mesh screen in the gasoline line and keep the dirt sump on it cleaned.

The Marmon and Winton installations were equipped with a strainer manufactured by the Colodar Engine Co., 276 Jackson avenue, Long Island City, N. Y. Don't forget to put a loop in all water, gas and oil lines where they attach to the engine. A distance type of water thermometer should be installed on the dash and the temperature should be maintained above 140 degrees Fahr. and not over 190, controlling the temperature either by radiator shutters or a cooling system thermostat. The radiator shutters will generally permit of slightly better temperature control.

Another attachment, which is not absolutely necessary, although of great benefit as a check on the oiling system, is the distance type of thermometer tapped into the oil sump in the crankcase. This affords an instant indication of possible trouble from lack of oil or failure of the oil pump. A warning should be inserted here regarding the running of the engine for any length of time at a temperature below 140 degrees Fahr. If the engine is operated below this temperature there is a liability of burning out the exhaust valves and it is, therefore, recommended that the engine

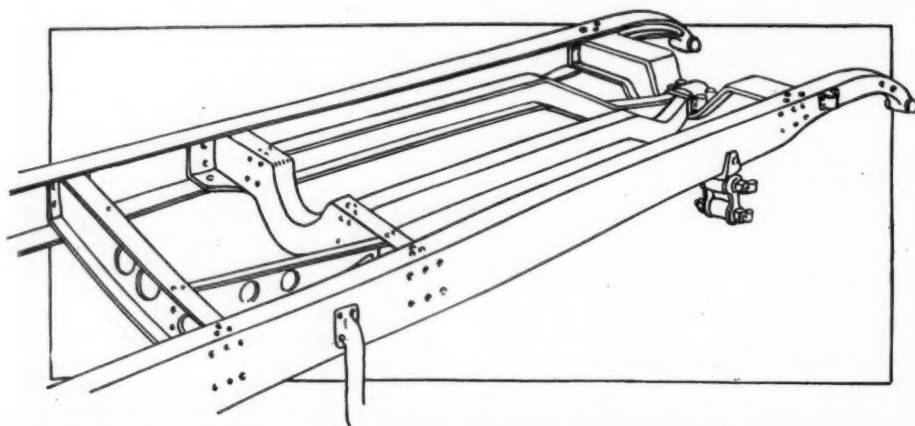


Fig. 5. Illustration showing general idea of three point support of subframe. Three point suspension reduces twisting strains imposed on crankcase

be slowly warmed up to at least 140 degrees, especially in winter, before going out on the road.

The oil temperature should not go above 140 degrees. If air pressure is desired on the fuel, the Curtiss Co. can supply a limited number of air pumps, which replace the tachometer drive on the OX5. The best settings for the Zenith double 06D carbureters, with which most, if not all, OX engines are equipped, is as follows: Choke 19, main jet 100, idling well 50, compensator 100. Richer setting than this, which would be near the airplane setting, would give a higher top speed, but materially reduce the economy.

A speed setting would be choke 23, main jet 120, compensator 120 and idling well 70.

Lubrication System

Nothing thinner than Mobiloil B, or its equivalent, should be used for lubricant. Some of the high grade oils designed for use in heavy duty tractors and the Air Service Standard No. 3501 are suitable lubricants. Castor oil may be used, but the usual caution concerning frequent cleaning of the crankcase and combustion chambers must be exercised.

The OX, as well as practically any other aviation engine, will show a tendency to over oil at idling speeds and because automobile service requires considerable idling some method must be devised to overcome this fault. There are three suggested methods, as follows:

1. Remove each piston and machine about 1/16 in. off the little skirt below the bottom ring and, unless holes are already there, drill about 12 No. 30 holes, sloping diagonally downward and inward into inside of piston and spaced equally around the piston. If the casting is cored or machined in, about the piston pin, drill two similar holes at the corners of the bottom of the spaces to take the oil back into the crankcase. The engine overolls because the high idling suction draws oil through and under or back of the piston rings and into the combustion chamber and if an easy path is provided for the oil to return to the crankcase the oil pumping will be practically eliminated. Then, by adjustment of the oil pressure valve, set the pressure so that it is not higher than 40 lbs. or lower than 5 lbs., at 500 r.p.m., so long as it dies not smoke when accelerated after idling. Smoking after the engine has been idling is an indication of either too high pressure, poorly fitting rings or pistons that are not properly bled.

2. Use a method such as is incorporated in the Marmon cars, that is, an automatic by-pass controlled by suction in the engine manifold so that when suction is high, as when idling, the oil is bypassed from the pump into crankcase and when suction drops with an increase in engine speed the bypass valve closes and the oil goes into the camshaft and lubricates. In this case set the oil relief as in the first method.

3. Put a tee in lead from the pump to camshaft and a pipe through an adjustable valve to the crankcase and set

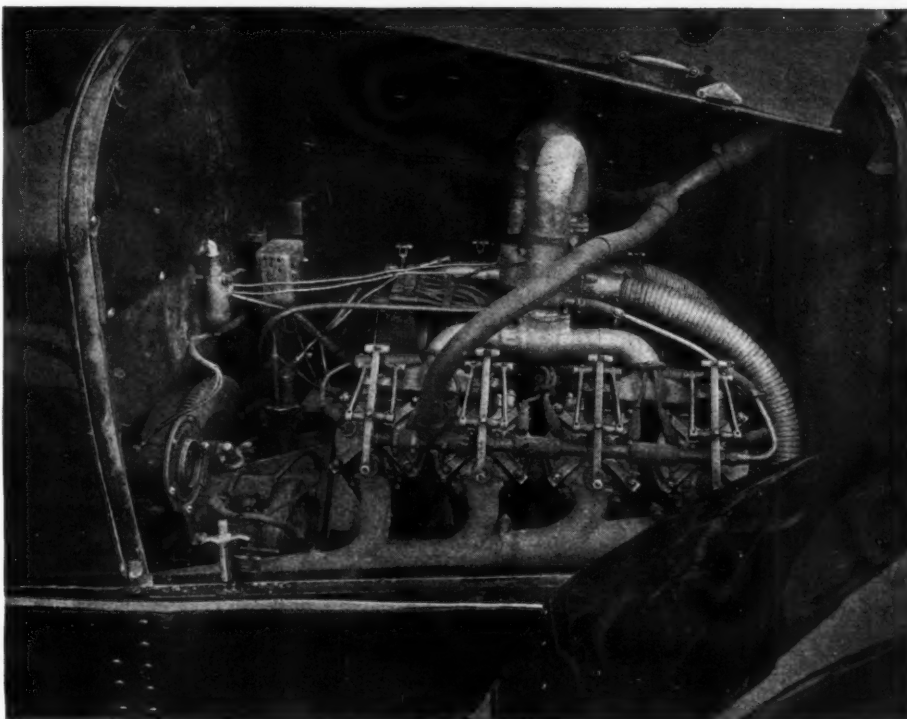


Fig. 6. Marmon installation. The change in inlet manifolding permits of installation of the generator in the Vee between cylinder blocks. Starter is mounted at right rear of engine

this first valve so that the pressure at 5000 r.p.m. will not be more than 10 lbs. The pressure, idling, should then drop to about 2 lbs. or less. This last method is the least efficient, as it tends only to prolong the time period between plug cleanings. It is, therefore, recommended that, if a first class job from the standpoint of lubrication is desired, the method suggested in 1 be followed.

Either one of the oil fillers may be used and it is best to provide it with an extension so as to bring its location to the point in the chassis layout where it will be most convenient for filling.

Special Parts for Installing Hand Crank and Generator

The Curtiss Co. can supply a longer water pump shaft for coupling of a combination generator drive sprocket and starting dog, and also another starting dog for the starting crank. Be sure that the water pump glands are well packed.

Propeller Hubs Should Be Carefully Fitted to Crankshaft

The ball bearing on the propeller hub end of the OX5 crankshaft is of the double thrust type. In mounting flywheel on the propeller hub particular care should be exercised to see that hub is fitted very tightly on the crankshaft taper and securely locked, as most of the strains imposed at this point will be jerky or intermittent in character. Also see that other parts of the flywheel are rigid and arranged so as not to come loose. The particular drive in the individual chassis will determine the best method of making the hookup.

If the engine is received with the propeller hub detached from the crankshaft, or if the crankshaft shows the least sign

of a roughened surface at the taper, it is advisable to remove the key and, with fine valve grinding compound, lap the hub to the tapered end of the crankshaft. Only enough lapping to show a full surface over the area of the taper should be done. After lapping hub to crankshaft, determine whether hub runs true. If the hub runs true the fitting of the flywheel and clutch parts can then be completed.

The flywheel and clutch assembly, all fastened to the crankshaft, should be balanced on knife edges before the parts are finally assembled. If the construction is such that there is no necessity for the removal of the crankshaft, it is recommended that the flywheel and clutch assembly be mounted on the propeller hub, which in turn should be carried on a suitable arbor and the assembly balanced on knife edges. It is assumed beforehand that the crankshaft is in balance so that, although mounting the flywheel and clutch assembly on the crankshaft for balancing is not absolutely necessary, it should be remembered that it is absolutely necessary to balance the flywheel and clutch assembly if you wish to secure a smooth running engine.

Where the engine is used for a service that does not require frequent removal of the propeller hub, such as in an automobile chassis, it is customary to shrink the hub to the crankshaft taper. A pail, or bucket, of boiling water should be close at hand and, when everything is set for the attachment of the hub, it should be plunged into the boiling water and allowed to remain there until it has reached about the same temperature as the water. This will expand the hub bore somewhat and will allow the hub

drawing up nut to force the hub to a firm seat on the shaft without having recourse to a long handled wrench. A monkey wrench not shorter than two feet or longer than 32 in. should be used to tighten the nut, if the hub has been heated as described.

Exhaust Pipes

In the photograph of the Winton installation it is to be noted that exhaust pipes are of ordinary J. N. type turned down and back into a 3 in. pipe. This pipe has grooves cut into it to allow the gases to escape. The sound of the exhaust with this construction is a purring or drone and the bark has been almost entirely removed. A sleeve connection might be more desirable in the exhaust line just back of the engine on this large pipe, to take care of the vibration and frame distortion, although no trouble has been experienced without it. The Marmon installation, as shown, has been made with special exhaust manifold. The little insulating plates to keep the exhaust heat away from the exhaust valve springs are advisable as used on the J. N. airplane.

Ignition Timing

The OX-5 engine when installed in the

JN airplane is set with full magneto advance about 28 degrees before top center. The engine will idle better and perform a little better at 500 r.p.m. pulling, if the spark is placed about 15 degrees before top center. Hook up spark lever control for full retard operation and the engine will not kick on cranking if magneto is fully retarded. At 1000 r.p.m. on the level roads 28 degrees is not too much advance.

Radiator Capacity Required

A radiator with 90 sq. ft. of cooling area will cool satisfactorily, in eastern climate, the year round, with no fan. If fan is used the area can, of course, be less. Radiator cooling area is computed as follows:

Cooling area in feet— $10.38 \times$
average width in feet \times average
depth in feet \times core depth less
 $\frac{1}{2}$ in. in inches. For honeycomb
or square tube radiators with $\frac{1}{4}$
in. tubes.

It must be realized that not every single item can be covered in supplying directions for the installations. The fundamentals to be followed should provide the constructor with enough infor-

mation that he will be able to make the various small changes that will suggest themselves on each particular installation. Arrangement of the piping, wiring and other details are left to the judgment of the constructor, who need only follow the current automotive practice where instructions do not cover the detail in question. A few pointers to be observed when driving follow:

Watch oil gauge and see that pressure at 500 r.p.m. is not less than 5 lbs.

Water temperature not less than 140 degrees and not more than 190.

Oil temperature not higher than 140 degrees.

Note—If water is not boiling and oil is being pumped, the temperature will be below 140 degrees Fahr. if Mobiloil B or equivalent is being used.

Keep valve actions oiled where holes are provided, also base of intake push tubes and intake spring yokes with good machine oil.

A dash priming device will assist in starting the engine in cold weather.

Parts Makers Hear of Great Automotive Market of Future

(Continued from page 19)

an evil, is, on the contrary, a real necessity to practically all the manufacturers in our lines; and that, much by the same token, he is a necessity to the dealer and consumer.

"It is an obvious fact that there is a constantly increasing demand for replacement parts and accessories. The frequency of replacement is primarily dependent upon the nature of the part. Some, due to the use to which they are subjected, or inherent fragility, must be replaced several times a year, while others may last the lifetime of the vehicle, except in cases of unusual mishap.

"This particular class of business now is greater in volume than the sale of new vehicles. Consequently, for many manufacturers, the replacement field presents a larger opportunity than does the equipment business of car manufacturers or engine builders.

"Broadly speaking, I believe the parts maker, for whose product there exists any considerable volume of business, is losing a considerable and legitimate profit by confining his sales for service purposes exclusively to the manufacturers to whom his product is supplied for equipment purposes. Of the various channels of distribution to the retail trade, I think that only the manufacturer with a huge volume of business is justified either in establishing his own branches or selling direct to the retail trade.

"The exclusive distributor plan perhaps has some unique advantages, but usually results in restricted sales, and consequently restricted service, to the vehicle owner and has undesirable reactions in several directions. Therefore, for the vast majority of parts manufacturers for whose products there exists a reasonably large volume of business, I believe the well organized, established and financed automotive equipment jobber offers the most economical, most substantial and most profitable method of distribution.

"The automotive jobber now, figuratively speaking, acts as a purchasing agent for his retail customers, as well as a warehouse and financier of the movement of merchandise from manufacturer to retailer. Consequently the jobber has many expenses in the conduct of the business, expenses that somebody must assume. Among them may be mentioned: stocking, inspection, investment, superintendence, distribution, untimely obsolescence and so on. As I see it, the manufacturer who sells the jobber eliminates most of the expenses and the dealer who buys from him secures service and many other obvious advantages not otherwise obtainable.

"So the name 'jobber' is in fact only a name for a number of necessary functions in the distribution of merchandise. He may be dispensed with in name, but the function which the jobber performs must be performed by someone, and it seems to be pretty well agreed that the jobber who is properly organized, properly financed, and experienced in his line of business can perform these necessary functions more cheaply and efficiently

than the individual manufacturer can for himself.

"Just now jobbers throughout the country are engaged in an active campaign toward better merchandising. The 'Ask 'Em to Buy' and 'Ask 'Em to Repair' campaigns are being conducted largely through jobbers and are making better merchants of the supply dealers. This also applies to the garage and repair man, to the ultimate benefit of the accessory manufacturer. These campaigns also have been of very great benefit to the jobbers' sales organizations.

"Another of the results is that of the dealers tying themselves more closely to the jobber, who is teaching them better and more productive merchandising methods. These and similar campaigns and other good stimulants mean more efficient jobber distribution, increased business and more substantial accounts for the manufacturer.

"I am not holding a brief for the jobber, but there are many good reasons why we should cultivate him and his trade and help promote his business, thereby promoting our own. There are so few apparent or real reasons why we should not tie up with him that it seems to me there is not much room for meritorious argument except in a comparatively few cases.

"I believe we should make the jobber, in a way, a part of our organizations. He is performing a service for us that is of great importance and value in the developing of our businesses. He is, broadly speaking, performing this service better and more economically than we can and will do it. He will do it even better if we give him proper and substantial co-operation."

Moon Dealers in Chicago Unite to Open "Automobile Row" Salesroom

Dealers Sales Corporation Is Formed by the Quinlan Motors Company

A happy adjustment of community dealer relations, which sometimes are a source of disagreeable feeling under the conditions incident to large city distribution, has been achieved by the 15 retailers of Moon automobiles in Chicago under circumstances which permit them to market a standardized alteration of the factory product, designed to appeal especially to city owners for year around use and to sell at an attractive price.

The product upon which these dealers are concentrating their sales effort is the Moon phaeton having the standard one-man top replaced with a permanent top which may be completely enclosed for winter driving. Having contracted with a top manufacturer for these tops at an advantageous price, the Moon dealers have succeeded in getting a well-fitted top, harmonizing with the general lines of the car and producing an altogether attractive appearance.

To get full advantage of the sales appeal of this car the central agency of the dealers is advertising it as "Chicago's Own" under the name of the "Winsome." This name was designed to denote that the car is equally comfortable in winter and summer.

A Notable Feature

Another notable feature of the advertising is the fact that the price quoted is for the car fully equipped, with the permanent top, summer curtains and winter sides with glass windows. This advertised price is \$1612.50 as compared with \$1295 for the standard phaeton f.o.b. St. Louis. The first contract calls for 250 of the permanent tops and within a few weeks after starting this arrangement the dealers had delivered 27 of these cars.

Back of the closely co-ordinated activity of the 15 neighborhood dealers, which has made this unique merchandising plan possible, is a period of long and careful study of community dealerships by J. H. Quinlan, president of the Quinlan Motors Co., Chicago distributor for the Moon.

The problem was not an important one as long as the great bulk of sales was made on "automobile row" which in Chicago is Michigan avenue. But when neighborhood dealers began to multiply and to gradually absorb an increasing proportion of the total sales it was found that something ought to be done to bring about a better feeling and a fairer financial sharing among all the dealers. Of course automobile row could not be abandoned, for the place on the "row" will always get a large share of business.

Early in his handling of the distributorship, Quinlan completely divorced the retail and wholesale distribution. He established the offices of his distributing company in a downtown office building and saved the expense of maintaining an expensive store on Michigan avenue. From this office he dealt with the various retail dealers in his territory. But he continued his effort to work out a plan for Michigan avenue representation which would be fair to all the community dealers.

Salesroom Established

The solution determined upon was the formation of the Dealers' Sales Corporation, capitalized for \$15,000 owned equally by the 15 neighborhood dealers. The Dealers' Sales Corporation maintains a store at 2020 Michigan avenue, with manager and salesmen employed by the corporation. All models of the Moon are on display at this store and sales are made in the regular way. If a community dealer notifies the sales corporation of an intended visit by a prospective purchaser to whom a sale is later made, then the full profit on that sale goes to the community dealer just as if he had made it in his own store. But if the sales corporation has not been put in touch with the purchaser through one of the community dealers, then the profit goes to the corporation and all dealers, being equal stockholders in the corporation, will share equally in its final distribution.

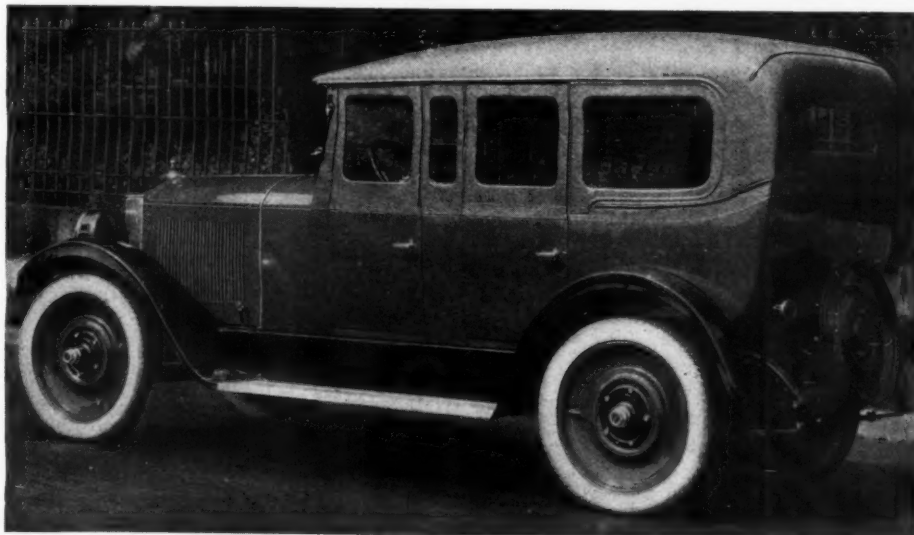
The sales corporation's store also serves as a central depot for parts, supplies and accessories, relieving the community dealers of the necessity of carrying full stocks of these. The servicing is all done by the community dealers and a dealer who services a car the sale of which is credited to the corporation is reimbursed accordingly by the corporation.

Provision has been made to allow the sales corporation manager to become financially interested equally with the dealers. The financial arrangement includes \$15,000 first preferred, 10 per cent accumulative, fully participating stock, and 250 shares of no par common stock non-participating. The common stock is controlled by the Quinlan Motors Co. At the end of two months of operation under this plan the investment of each dealer in the corporation was approximately \$800 and in that time, according to E. L. Cord, secretary and general manager, the return to each dealer in profits had been nearly \$300.

Morale Greatly Increased

So successful has the arrangement been, both as to the sales corporation and the specially designed car, that the Quinlan company states that it has had no criticism from any source and the morale of the dealers has been greatly increased through the assurance that they get their full share of the profits.

This organization of dealers is something which offers a valuable suggestion to other retailers of automobiles.

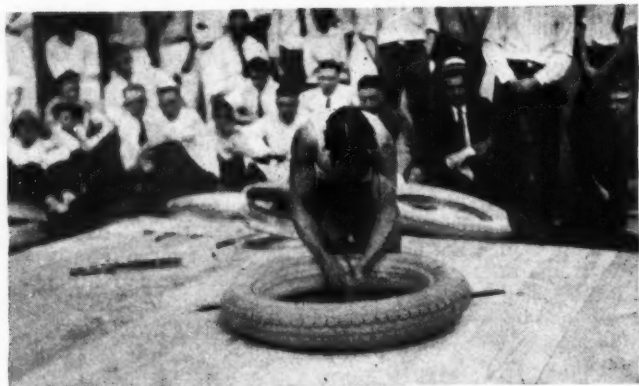


This is the Moon "Winsome" model, exclusive feature of the Dealers' Sales Corp. of Chicago. A winter top is mounted on the Moon phaeton and the car sold at \$1612.50, delivered

MOTOR AGE'S PICTURE PAGES

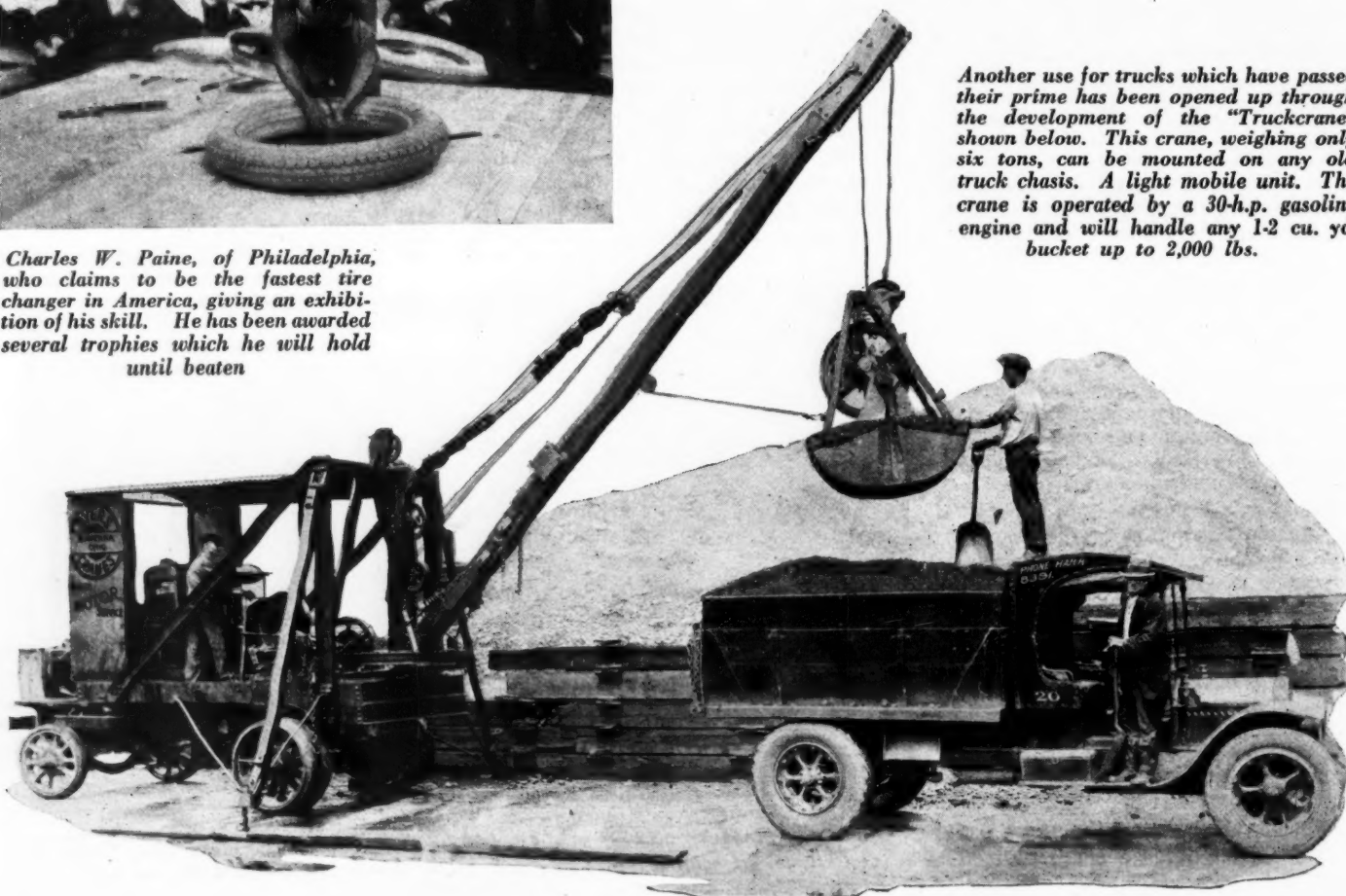


Rather than cross from France to England by the Calais-Dover boats, a party of 62 American schoolteachers, who have been touring Europe, arranged to travel from Paris to London by airplane. Ten of the "schoolmarm" and their pilot are shown here after their arrival in London. A second plane can be seen just making the landing



Charles W. Paine, of Philadelphia, who claims to be the fastest tire changer in America, giving an exhibition of his skill. He has been awarded several trophies which he will hold until beaten

Another use for trucks which have passed their prime has been opened up through the development of the "Truckcrane" shown below. This crane, weighing only six tons, can be mounted on any old truck chassis. A light mobile unit. The crane is operated by a 30-h.p. gasoline engine and will handle any 1-2 cu. yd. bucket up to 2,000 lbs.



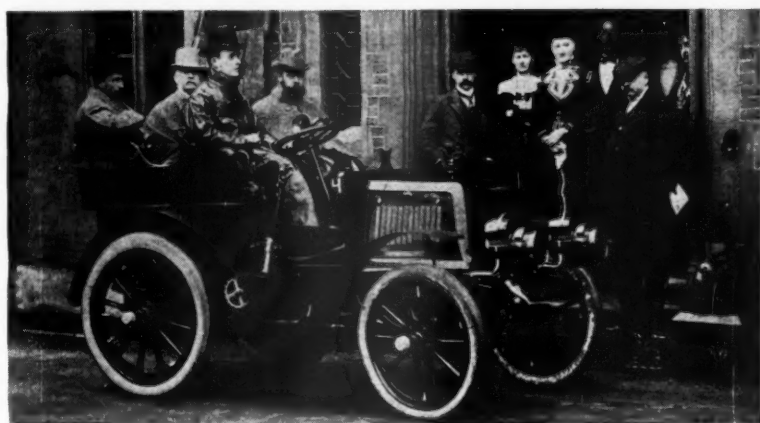
OF AUTOMOTIVE INTEREST



H. B. Hiner, General Manager of the Red Ball Transit Co., the man behind the idea



The Red Ball Transit company specializes in direct house-to-house, inter-city moving by trucks, cutting out the delays, reloadings and crating required in shipping by freight. A train of eight vans, which made a round trip from Indianapolis to New York City in winter, is shown above

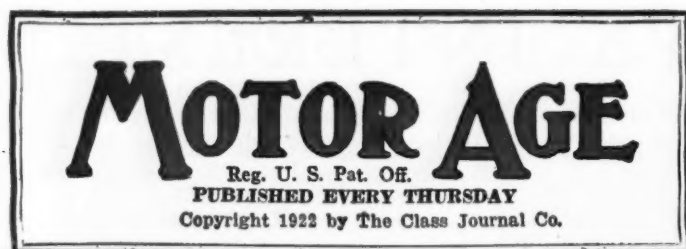


Above—The first Rolls Royce. King George, then the Prince of Wales, is shown taking a chance in the flivver driven by the Hon. C. S. Rolls (at wheel)



One of the pioneers in the automotive world. The steam propelled vehicle at the right was built by Achille Philion of Chicago in 1893





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Horace M. Swetland, President
 W. I. Ralph, Vice-President E. M. Corey, Treasurer
 A. B. Swetland, General Manager
 David Beecroft, Directing Editor

Mallers Building, 59 East Madison Street, Chicago

BUSINESS DEPARTMENT

E. E. Haight, Manager

EDITORIAL

Clyde Jennings, Managing Editor
 E. M. Ikert, Technical Editor

DETROIT OFFICE
 J. Edward Schipper

WASHINGTON OFFICE
 816 Fifteenth St., N. W.

BRANCH OFFICES

New York City—U. P. C. Building, 239 West 39th St., Phone Bryant 8760
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Cable Address.....Motage, Chicago
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The Spirit Within

WHETHER it be a business, a state, or a nation, external activity and success is largely determined by the harmony of internal operations. In the business field this depends on the manager of the business in question, and how successful he may be in getting that spirit of co-operation, without which no business can truly succeed.

Those who have observed the methods used by employers will agree that they fall into two classes, pushing and leading. The employer who pushes his men, will no doubt get results of a sort and, while the time clock may be a necessary evil in the present system of things, there is no question but what it breeds a spirit of resentment that is detrimental to full and complete co-operation.

Even where a time clock method is necessary, the spirit of good fellowship can be extended by the manager of a concern to even the least important employe, and the result will accord with the spirit of good will expressed.

We all like to be flattered whether we admit it or not, being proud of the ability we think we have, and so it is that a word of commendation will produce results

where censure will fail. Assume for example that a mechanic in the shop has forgotten a cotter pin on some job, and the manager wishes to call the matter to his attention. He might say, "Hey, you, haven't you any sense at all, don't you know enough to put cotter pins in where they belong?" Or again, if more diplomatic, "Good morning, Fred. How's the champion engine builder today?" And Fred will smile all over, even when he knows that he is far from deserving the appellation. Then when he is feeling good, add: "And by the way, you left out a cotter pin in that job you did yesterday, and we just happened to catch it. Watch out for those things. That might have caused somebody a lot of trouble."

Is there any question as to the method that will not only get Fred's good will, but also make him a more careful and conscientious worker?



Service, Satisfaction and Sales go hand in hand.



Christmas, Mistletoe 'N Everything

THE Merchandising Committee of the Automotive Equipment Association has opened a campaign to promote automobile accessories and equipment as Christmas gifts. It is a notable fact, frequently commented upon in *MOTOR AGE*, that the automotive dealer has to a very large extent ignored Christmas as a buying peak for articles of the luxury type. Many automotive accessories come in this class.

A foot warmer, for instance, is not absolutely necessary. Cars have been used extensively without heaters and will continue to be used without them, but that does not lessen in the slightest the desire of most persons who ride in cars in winter to be comfortable without being forced to wear heavy overshoes, woolen boots and other articles of this sort that are sold by many stores as luxury type Christmas gifts. A heater is an ideal Christmas gift.

Christmas buying is a good deal of a habit. Automotive equipment has not been on the market long enough to become a part of this habit without some urge. It is up to the dealers to take care of creating this urge in their communities. The makers of many accessories that are appropriate for gifts will carry on a national advertising campaign, but such advertising needs the local aid to become effective for your store.

It is not a bit too early to be looking over your stock to see what you carry that is suitable for Christmas selling, seeing that you have a proper stock of these goods, planning the special advertising, the show window appeal, getting your lists ready and in general planning your campaign.



The public is quick to give respectful patronage to a business that aims to serve it honestly and intelligently.



Cleaning Before Repairing

ANYONE who has occasion to go to a dentist will observe that the doctor usually cleans the teeth before working on them. He does this to be sure of his ground. It is impossible for him to tell exactly what work has to be done and the exact condition of the teeth until he has made it possible to examine them properly.

The same method of procedure should be followed

in the automotive shop. No mechanic who wants to do a good job of repairing thinks of working on dirty parts. It is easier to tear down a unit when the exterior has first been cleaned thoroughly. A nut turns very hard upon threads which are gummed with mud or other foreign matter.

A helper can clean the parts before the expert mechanic touches them. The man whose job it is to remove the gearset or clutch, for example, should learn that first of all he must clean the units. This preliminary cleaning also has the additional value of not bringing grease and dirt into the shop proper. All cleaning can be done in a certain spot, thus assuring cleanliness in other parts of the establishment.

When a unit is disassembled, the parts also should first be cleaned, after which inspections can be made by the proper persons. This cleaning certainly should not be done by a skilled mechanic, as a helper can do it as well. The skilled man is for more important things. He is the man to micrometer the bearings after the helper has done the cleaning. He should not be expected to clean them.



No business can sign its own declaration of independence and remain healthy and progressive.



As to Tire Dealers

A TIRE manufacturer at a recent meeting with others in the same business made the unqualified statement that "there are no legitimate tire dealers, they are all 'Gyps.'" He added that the "Gyps" are the only ones who make money enough to remain in the business.

He did not specifically define what he meant by "Gyp," but from his talk the inference was easily drawn that he had in mind the dealer who buys and sells on price alone without regard to quality. He spoke of the dealer who will grab up a carload of tires of any name or no name at all simply because he can get them at a price that will enable him to splash price quotations all over his windows far below the advertised prices of well-known tires. Of course this dealer makes no pretense of assuring the quality of the article he handles.

But the worst of it is, according to this manufacturer, that all too often this so-called "Gyp" dealer finds himself able, surreptitiously or otherwise, to purchase considerable quantities of the product of large and favorably known manufacturers at such astonishingly low figures that the dealer who tries to do business on the regular basis suddenly finds across the street a gaudy offering of the very respectable merchandise he handles, at prices considerably lower than he himself has to pay for it.

MOTOR AGE does not believe the tire manufacturer's statement that there are no legitimate dealers is literally true, and probably the author of the statement merely spoke figuratively in order to emphasize the seriousness of the problem which concerns the whole tire industry. Certainly there are many automobile dealers who maintain highly respectable tire departments and conscientiously offer to their customers only such goods as they are confident will give honest service and on sound business terms.

The shoddy tire will eventually destroy its own market and the dealer can hasten the day by educating the car owners to the desirability of using quality tires. But even this does not solve the problem created by

the manufacturer of quality tires who permits some part of his product to get into the hands of the "Gyps" at below-cost prices to compete with the other part of his product which he has sold to recognized dealers on the regular business basis. Neither does it solve the problem of a sufficient discount for the recognized dealer to enable him to make a profit for a business conducted in the regular way. The manufacturers themselves have some duties in the matter.



Business is well trained, only going where it is invited and staying where it is well treated.



The Fly in the Ointment

A MECHANIC working in the New York automobile district went out for lunch, as was his custom, to a little restaurant on 8th Ave. and was having a very enjoyable meal. The price was reasonable and the food tasty, the desert being tapioca pudding, which had always been a favorite with him. What was his dismay when he had half finished the pudding, to find in it a,—well we had better not say exactly what it was, but it effectually killed his desire for that kind of pudding and, in fact, he never went back to that restaurant again, although he had been patronizing the place for a year, and knew that the food was usually good. One bit of carelessness had lost the restaurant this man's trade.

The Mean Well Service station had built up quite a business and counted among its assets the good will obtained through its own work and advertising as well as the national advertising of the manufacturers, whose goods it handled. A certain car owner bought at that service station an accessory that was well advertised but, when he went to install it, he gave his hand a nasty cut with a sharp fin, which the maker, in the rush of production, had neglected to remove. The car owner knew, of course, that it was not the fault of the service station that sold the article, yet he could not quell a certain amount of resentment against them for handling an article that was carelessly prepared for the market.

What is the answer? Eternal vigilance, together with enough interest in the owner's problems to watch for such things and catch them before they cause a good customer to go elsewhere. Co-operation with the manufacturer will often remedy defects with which he may not be familiar, but regardless of the method employed of getting better merchandise, there is no question but what the article that goes to the car owner should be satisfactory in little ways as well as in its essential functions.

Do not make the mistake of letting petty annoyances drive away trade that you have bought with local and national advertising.



Annual Red Cross Roll Call

THE Annual Roll Call of the American Red Cross, in which its membership is renewed from year to year will take place in the period between Armistice Day, Nov. 11, and Thanksgiving Day. This is the only appeal that the National Organization makes during the year; and is for the purpose of maintaining its membership at such a point as will enable it to perform those duties which are placed upon it by Congress.

Ford Plants Suspend Operation

Car Manufacturing Stopped At All of Company's Branches

**Production of Parts for Cars Now in
Service Will Continue
for a Week**

DETROIT, Sept. 18—Manufacturing operations were suspended Saturday at all the plants of the Ford Motor Co. in this city and its assembly branches throughout the country will close as soon as operating conditions permit, most of them within this week. No formal statement as to the duration of the shutdown has been made.

Going into the closing period, the company declares there are no stocks of new cars in its branches or dealer salesrooms throughout the country and that the closing is prompted solely by the coal and steel situations. Retail sales in the past four months and up to the closing day have been about 5,000 a day, taxing the capacity of production facilities.

The experimental department of the factory is continuing work on improvements in the line, despite the general closing, and it was said changes might be expected as the experimental work is advanced.

As a result of the closing, about 80,000 men in the Ford factories, including Lincoln, are out of work in Detroit, and probably 30,000 more in Ford assembly plants are affected.

A considerable number of men will be employed for another week in manufacturing parts for Ford cars now in use and the service department will continue to function throughout the shutdown period. An inventory is being taken in all plants while closed.

OVERLAND PRICES REDUCED

TOLEDO, Sept. 18—New prices have been announced for the Overland and Willys-Knight cars as follows:

Overland		
	Old Price	New Price
Phaeton	\$ 550	\$ 525
Coupe	850	795
Sedan	895	875
Willys-Knight		
	Old Price	New Price
Phaeton	\$1375	\$1235
Sedan	2095	1950
Roadster	1350	1225
Coupe	1875	1795

OPERATING COST 10 CENTS A MILE

MILWAUKEE, Wis., Sept. 18—The Railroad Commission of Wisconsin has arrived at the interesting figure of 10 cents a mile as the cost to the average owner of operating his car, and this is now used as a standard in all computations made by the commission in the distribution of costs between the public and railroads growing out of the relocation of grade crossings, separation of grades, etc. If a grade crossing relocation shortens a highway two miles, and

the average number of motor vehicles traveling over this particular highway is 300 a day, the commission figures that this saves 600 miles a day to car owners, and at the rate of 10 cents a mile, the saving to the public is \$60 a day.

RECEIVER FOR COMET COMPANY

DECATUR, Ill., Sept. 18—The Comet Automobile Co. went into receivership here and the Milliken Trust Co., and Robert W. Jones were appointed receivers. The company is said to owe \$60,000 to banks, protected by \$250,000 in bonds, and other debts of about \$75,000. The plant is valued at about \$400,000.

RICKENBACKER WEDS MRS. DURANT

NEW YORK, Sept. 16—Edward V. Rickenbacker, for whom the Rickenbacker car is named and who is connected with the factory, was married yesterday to Mrs. Adelaide Durant, divorced wife of R. C. Durant, automobile builder and racer. They sailed today for Europe.

FISHER BODY CO. EXPANDS

DETROIT, Mich., Sept. 18—The Fisher Body Corporation of this city announces an expansion program involving assembly plants at six points in the United States, aggregating more than one and a half million square feet of additional floor space, which will be devoted exclusively to the manufacture of Chevrolet enclosed bodies.

The corporation through a newly organized subsidiary, the Fisher Body St. Louis Company, has taken over the large General Motors Buick plant, in St. Louis, which will be devoted exclusively to the manufacture of closed bodies for the superior Chevrolet.

STREET RAILWAY FIGHTS JITNEYS

BIRMINGHAM, Ala., Sept. 18—Plans are under way backed by the Civic Association, an organization composed of approximately 2,000 Birmingham business men, and the Birmingham Railway, Light & Power Co., to have the "jitney" put off the streets of Birmingham.

The jitney system of Birmingham is unique in many respects and its tolls are digging into the profits of the local street railway. It is estimated in a resolution framed by the directors of the civic association and which will probably be put through at the next meeting of this club that the 235 jitneys operated in Birmingham took in something over \$1,000,000 last year, or approximately \$5,000 each. This is considered as being a direct reduction from the street railway company's income.

HART-PARR TRACTOR INCREASED

CHARLES CITY, Ia., Sept. 15—The prices of the Hart-Parr tractors have been increased, the model 20 now being \$845 instead of \$765 and the model 30 \$1065 instead of \$895.

Total of 1,671,418 Cars and Trucks Made Since January

**August With Production of 272,000
Was Second Highest Month
of Year**

NEW YORK, Sept. 16—For the fourth time this year, the automotive industry established a new record in the production of passenger cars and trucks, the output for August being 272,000 an increase of 12 per cent over the previous month and a gain of 53 per cent over August of last year. It closely approached the mark made in June, which thus far has been the banner month in the industry.

In view of the consistently strong demand followed during the preceding months, it would not be surprising if a delayed seasonal falling off in sales came in September which, with the aftermath of the rail and coal strikes, would result in a slight curtailment of manufacturing schedules. Manufacturers have adhered scrupulously to their policy, announced earlier in the year, that production would be governed solely by consumption.

The decline in sales usually experienced at this season has not been apparent except in isolated instances and has not been such as to lead to the conclusion that any general halt to the buying movement is imminent. To the contrary, the falling off in sales in these few cases during August has been more than offset by gains elsewhere.

There are many reasons for believing that should a lessened demand come, it will be relatively slight. Not the least is the feeling that the agricultural districts, under the impetus of a bumper harvest, will enter the market more aggressively than in the past and become an active purchaser of both passenger cars and trucks.

Improved business conditions, higher wages to labor and the anticipation of good crops have already had their reflection in the demand for motor vehicles. They lead to the conviction that the rest of the year will be normal, at least, with a strong probability that it will not fall very far behind the general average for the first eight months. In that period the total production was 1,671,418 as against 1,668,550 for the entire year of 1921.

Every indication is that next year will see an even greater output. Anticipating such a condition, manufacturers started an extensive enlargement of their manufacturing facilities. While such additions, in many cases, will be used to meet the increased demand for enclosed body types of cars they will also be able to take care of the demand for both open and enclosed models.

Milton Wins Opening Race at New Kansas City Speedway

Initial Contest Marred by Two Serious Accidents—Roscoe Sarles Killed

KANSAS CITY, Mo., Sept. 17—Tommy Milton, in a Leach Special, was the winner of the 300-mile race which opened the new speedway here this afternoon. His victory came after a series of accidents which resulted in the death of one of the most prominent of American drivers, Roscoe Sarles, and the injury of nine

others, including Jimmy Murphy, winner of the French Grand Prix last year and the leader in this year's championship title race; Eddie Hearne, Joe Thomas and Peter De Paolo.

The new speedway, one and one-quarter miles in circumference and made of wood, is Kansas City's contribution to the racing world and the first race brought together nearly every one of the racing stars of the present campaign. Originally scheduled to open Saturday, a postponement was necessary because of weather conditions, and the event was decided this afternoon before a crowd of 56,000.

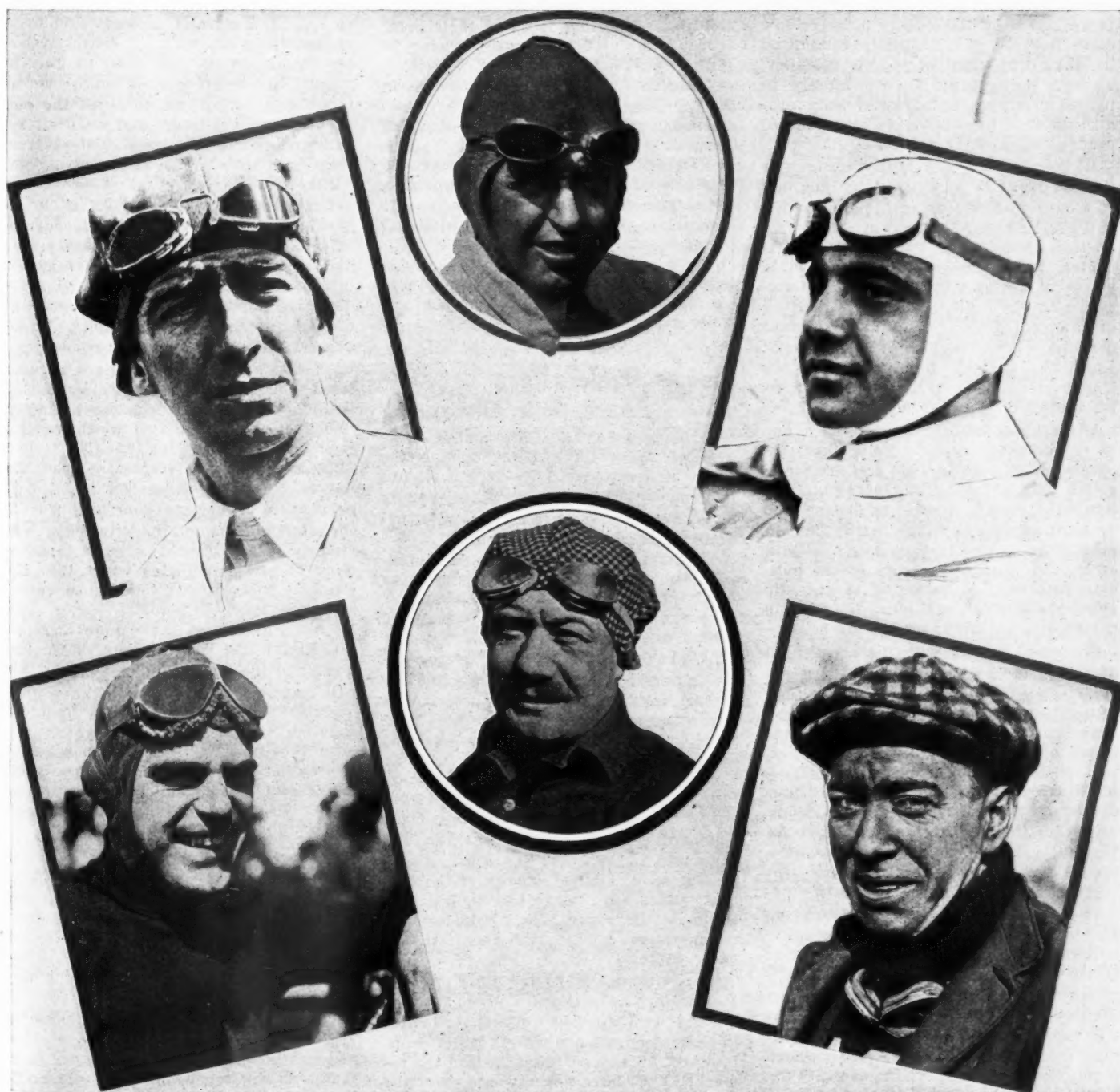
The accidents naturally disrupted the

race as a contest, but still a hair-raising finish between Milton and Harry Hartz resulted, the decision not being reached until the tape was crossed for the last time, when not more than 100 feet separated the battling leaders. The average was 109 m.p.h. Six cars finished, with the following results: Tommy Milton, first, time 2:46:52.96; Harry Hartz, Hartz Special, second, 2:47:10.28; Frank Elliott, Leach Special, third, 2:49:46.60; Ralph Mulford, Duesenberg, fourth, 2:50:04; Jerry Wunderlich Duesenberg, fifth, 2:56:46.47; Bennett Hill, Miller Special, 2 hrs. 56 min. .05 sec.

First of the accidents was the one in

(Continued on p. 34)

Drivers Who Figured in Kansas City Race



Top row, left to right: Jimmy Murphy, slightly injured; Tommy Milton, winner of the race; Peter DePaolo, cuts and bruises; center, Roscoe Sarles, killed; below, left, Joe Thomas, leg broken, and Eddie Hearne, internal injuries and cuts

Millions Going Into New Buildings

Factory Additions Under Way Show Expansion for Next Year

Dodge Brothers, Hup, Ford, Durant and Gray Among Those Adding to Manufacturing Space

DETROIT, Sept. 18—New buildings worth millions of dollars will be made ready for the industry in the remaining months of this year and the early spring of 1923. With the announcement by Dodge Bros., of a new eight story body and assembly building, practically every large maker in the middle class or low class field is now definitely committed to the expansion of plant facilities. Though the expansions are largely to permit of increased enclosed body production, they likewise mean that general production capacity will be larger.

Besides Dodge, the Hupp Motor Car Co. has recently announced the addition of a new manufacturing building which will give it about 50 per cent added production space. The Ford Motor Co. is contemplating the erection of assembly plants at Jacksonville, Fla., and Minneapolis in the United States, as well as in Tampico, Mexico. The Canadian plant capacity is to be doubled by 1923 through additional factory buildings, and the Manchester and Cork plants in the British Isles are being extended.

Work has just been started on a one story addition at the Lincoln Motor Co. plant, which will be 1600 feet long and which will be used for general production. No formal statement has been made by Ford officials as to the extent Lincoln production will be increased, but the size of the building under way would indicate that Ford is beginning to put into effect plans which will place the Lincoln car on a much larger production basis.

Columbia Motors, with the acquisition of the former Saxon plant, is in a position to triple its former production. Wills Sainte Claire is adding factory space for the special painting and finishing of its cars. The Buick Motor Co., with the addition of the former Scripps-Booth plant, has doubled its former production capacity. A new body plant is being built at Flint by the Chevrolet Motor Co., which it will lease to the Fisher Body Co. for the exclusive production of Chevrolet body work.

The Durant building program in the district is the largest of all. In Flint the buildings to be constructed for the Flint Motor Car Co. alone will cost approximately \$1,500,000 and will cover when complete 37 acres of ground. In Lansing, the buildings for the Star and Durant four are nearing the point where production will begin, giving capacity for about 300 daily of the former and 150 daily of the latter.

The Gray Motor Co. has started the

erection of an additional assembly building in Detroit, which will give it capacity in this district of about 200 daily. Similar assembly plants in Oakland, Calif., and Albany, N. Y., planned for operation before the season of 1923 will give a production capacity of about 100 daily in each plant. Philadelphia also has been mentioned as the site for an assembly plant which may be started this year.

There has been no expansion of truck manufacturing facilities in this section, because most of the plants were built to meet war time conditions. Truck business is showing steady gains, however, and makers are optimistic over the possibilities of putting most of their plant space into operation by the spring of 1923.

Aside from the building movement in the car plants, there have been large additions in the body field, many of which are now in construction, notably the Wilson and Fisher plants. In the parts field expansion has been held to a minimum, the most noteworthy exception being the increase in plant space at the Muskegon factory of Continental Motors.

The whole tendency in the industry is toward expansion, however, and there are few plants which have space not fully employed.

Chicago Dealers Keep Apace With Advertising

CHICAGO, Sept. 16—Automobile dealers in Chicago, this year, despite the great buying spurt, have kept well out in front with their advertising. Many dealers going even farther than to spend their regular amounts.

The advertising manager of one establishment says that his firm has spent as much money this year advertising new cars as ever, even though deliveries were as far as two months behind.

"We have spent much money on advertising our shop and selling tires and accessories," says an outlying dealer who advertises in a community weekly, "and I believe that it has helped sales wonderfully."

At this time, the dealers are coming forward with a greater amount of advertising than has been seen for some time. Enclosed cars are given nearly all of the space and whether the idea is a successful one or not is proven in the fact that sales, after a two-week lull, are again on the upgrade and hold promise of mounting even to the late fall and early winter.

Used car sales are the only part of the dealers' commodities that are not moving with marked uniformity. Sales in these departments are gradually dropping off, "because," one salesman remarked, "we have not got enough of the real used cars to meet the popular demand." By "real used cars" is meant cars that are bargains.

Retail Sales Continue at Brisk Rate in Milwaukee

September Business Not Up to That of Summer But Is Highly Satisfactory

MILWAUKEE, Wis., Sept. 18—Retail sales of passenger cars in Milwaukee, as analyzed by several representative dealers, have held up remarkably well so far in September, and while it would be unfair to compare actual transactions in number with those in April, May, June or July, the state of trade is said to be eminently satisfactory. A distinctly better feeling exists now than in July or August, in which months there was an inclination to hold off to await the outcome of the railroad and coal strikes and anxiety over the effect of these troubles on business generally during the winter months.

Dealer trade has an aspect of briskness, due to the fact that while current sales are not so heavy as last spring and summer, shipments from factories on orders booked in the last 30 to 60 days are now coming through, enabling dealers to place cars in hands of purchasers. This affects enclosed types largely, although some dealers encountered considerable delay in delivering roadster and touring models promptly.

One of the features of local trade is the unofficial statement that the Nelson-Mitchell Co., 525 Jefferson street, has delivered more than 150 new F-50 Mitchell cars since it became representative of the Racine factory in Milwaukee and vicinity last December, after a lapse of more than a year during which time the Mitchell was without established representation here.

An advertisement of the Jones-Cadillac Co., Eighth and Wells streets, on Sunday contained the significant statement: "It will probably interest you to know that over 80 per cent of our new Cadillac sales in this territory this year have been closed cars. We also happen to know of another dealer handling a popular medium-priced car in this territory whose closed car sales have been 90 per cent of his total new car sales."

TRUCK SALES IN CALIFORNIA

OAKLAND, Cal., Sept. 15—The motor truck industry had its largest single month of sales in California automotive business, according to figures just released in the September issue of Motor Registration News.

There were 1956 commercial motor vehicles to find their way into various mercantile channels in this state, a total that was greater by 12 than the number registered in May of this year, the former high month. The increased truck sale in August, over July was 271.

Cadillac Head Says Factory Will Continue Full Operation

This Year's Production to Be Greatest in Company's History, Says H. H. Rice

DETROIT, Sept. 16—Cadillac plans of production include the running of the factories full force during the winter, with a production even greater than that of the past 12 months, which has been the greatest in Cadillac's history.

H. H. Rice, president and general manager of the Cadillac company, so informed Cadillac distributors assembled from all parts of the country at the annual distributors' convention at the Cadillac factory. Representatives from nearly 100 Cadillac distributor organizations attended the convention.

Rice sounded an optimistic note concerning the coal situation and business in general:

"I believe that general business," he stated, "in spite of a few disturbances on the surface, is decidedly on the up-grade. I not only believe that people will be able to get coal this winter but also manufacturing concerns will get enough coal to operate.

"Strikes in any essential line of business are bound to be settled after a short duration. These strikes are too vital to last long. The crops this year are good and I believe the farmers will obtain good prices for them. Factories that have been shut down are gradually opening."

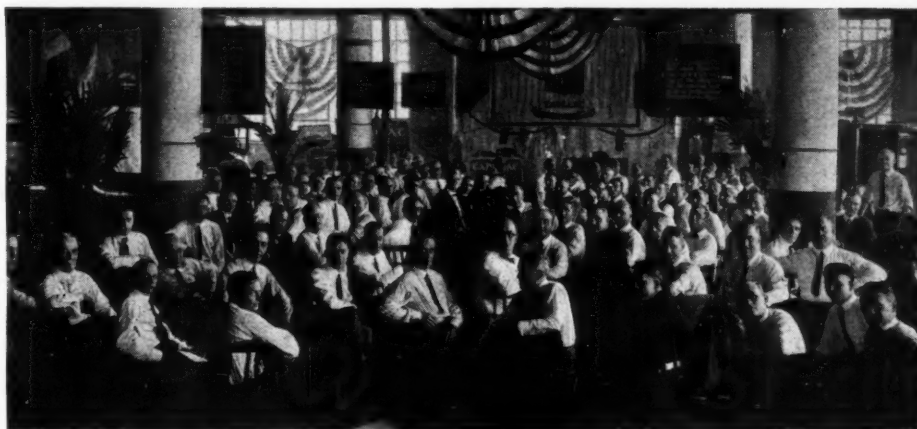
Lynn McNaughton, general sales manager, stated that during the 12 months just concluded the Cadillac organization had exceeded the business of any previous 12 months both in number of cars sold and in volume of business in dollars and cents.

Inglis M. Uppercu, New York distributor of Cadillac, paid tribute to the first model one-lung Cadillac just purchased by the company in commemoration of the twentieth anniversary of Cadillac production. The car was built in 1902.

The visiting distributors hied to the Bloomfield Hills Country Club one afternoon to enjoy golf. In the evening a banquet was held at the clubhouse. President H. H. Rice, Lynn McNaughton, general sales manager; Inglis M. Uppercu, New York distributor; P. T. Prather, manager of the San Francisco distributor organization; Roy Munger, Dallas, Texas, distributor; G. M. McWilliams, Toronto distributor; E. R. Clark, Springfield, Mass., distributor, and Dan Nolan, manager of the Cleveland distributor organization made short talks. Motion pictures concerning Cadillac cars were also shown.

Lynn McNaughton presided at the first morning session. One of the features of the convention room was a complete display of Cadillac cars, with the literature concerning the cars.

Cadillac Distributors' Convention



Preparing for the greatest year in Cadillac history, was the work of these men who gathered at the Detroit convention recently. H. H. Rice predicted the biggest year

FLINT CAR TO BE SHOWN SOON

NEW YORK, Sept. 18—The first showing of Durant's new Flint car will be given simultaneously in New York and Flint, probably this week. Production is expected to be started at the plant in Flint, Mich., by Jan. 1 and at the Long Island City plant possibly at an earlier date. Operations at the latter factory will depend upon the progress that is made on refitting the former Willys Corp. plant at Elizabeth, N. J., which Durant Motors, Inc., purchased and which it will use exclusively for the production of the Star and Durant.

These two cars are now being turned out at the Long Island City plant and no effort will be made to begin production on the Flint there, until they have been removed to New Jersey.

MANY WESTCOTT DRIVEAWAYS

SPRINGFIELD, O., Sept. 14—E. H. Gilchrist, sales-manager of The Westcott Motor Car Co., reports that August was one of the best months they have had on the sale of cars. It looks as if September will be a big month, he said. The new seven passenger model recently placed in production is giving good satisfaction. Numerous driveaways of Westcotts are reported. One machine was driven away recently by the purchaser to Birmingham, Ala.

GROCERY STORE AWHEEL

BUFFALO, Sept. 15—Buffalo is promised grocery stores awheel. According to an announcement made by the Entrez Stores Corporation 50 grocery stores on wheels will be put in operation here. The first two will operate in Kenmore, probably before Nov. 15, it was said. Contracts for 50 trucks have been placed.

HALF OF MAXWELLS ENCLOSED

DETROIT, Sept. 14—Reports by the Maxwell Motor Car Co., show that the enclosed car output is running 50 per cent of total production. From present schedules it is very likely that the company will reach its estimate of 56,000 cars as the total output for the year.

Substantial Reduction Made in Truck Freight Costs

NEW YORK, Sept. 15—A substantial reduction in freight rates on automobile bodies, ranging from 20 to 67 per cent, is announced by the Consolidated Freight Classification, which represents all of the railroads of the country. The new rates are effective about Nov. 15.

These reductions are the result of 18 months' efforts on the part of the Motor and Accessory Manufacturers' Association, the National Automobile Chamber of Commerce and the Automobile Body Builders' Association to convince the railroads that automobile bodies should take the same ratings as horse drawn vehicles. Representing the traffic department of the Motor and Accessories Manufacturers' Association, Herman Deuster appeared before the classification committee four times before the contention of the automotive industry was approved, and his perseverance rewarded.

Automobile dealers who sell chassis and fit special bodies will be financially affected by the new rates, for they will mean a considerable saving. For instance, a San Francisco dealer selling a Ford chassis and ordering a sport body from a body factory at Owensboro, Ky., would have to pay \$96.20 freight under the present classification. Under the new rate the charge would be \$32.10, which would mean a saving of \$64.10. In the case of special bodies like a Pierce-Arrow sedan or a Cadillac sedan there would be no saving unless the dealer filled the car; then he would save 20 per cent.

GOOD ACCESSORY BUSINESS

CHICAGO, Sept. 15—After the greatest summer season in its history, the automobile accessory business in Chicago is getting back to its accustomed stride. Dealers in accessories everywhere report sales in the past six months as beyond every expectation and preparation. Spot-lights, bumpers, stop lights and seat covers have been oversold in a number of places and every dealer expects that the winter will be as good by comparison as the spring and summer have been.

Sales on the Increase in Sioux City (Ia.) Territory

Tractor Activity Indicates Resumption of Buying by Farmers of District

SIOUX CITY, Ia., Sept. 16—Automotive business is on the upgrade in this territory. Of the 37 lines of cars handled by the 22 dealers who went out of business in 1921 only five have been picked up but optimism prevails among dealers and distributors as a rule.

Being fed from the farming sections of three states—Iowa, Nebraska and South Dakota—business in the automotive lines has reacted with the farmers' conditions in 1921. Some tractors are being sold which seems to indicate that the buying power of the territory has been improved.

Cheap cars are finding a good market, the dealers in some cases being unable to secure enough deliveries to fill their orders. Medium priced cars are a little slower, but sales in this class are increasing. Higher priced lines are moving very slow, but are for the most part cash sales.

Sales in the lower priced cars have been mostly on the installment plan. From 60 to 75 per cent of all cars sold in this territory during 1922 have been sold on this plan.

Strike conditions have affected the business slightly, several dealers reporting cancellations from this cause. No dealers report any embarrassment in deliveries because of transportation difficulties.

Open cars have been in demand during the summer months, although August showed a decided increase in enclosed car business. Light coupes are in strong demand.

(Continued from p. 31)

which Jimmy Murphy and Joe Thomas were involved. This was at the 50-mile mark, when Murphy's car threw a tire and skidded. Thomas, immediately behind, tried to get around, failed, and smashed into Murphy's car. Thomas came out of it with a broken leg and head injuries, while Murphy was only slightly hurt. Raymond Comer, Thomas' mechanic, sustained minor cuts.

A second thrown wheel caused the accident which resulted in the death of Sarles. Hearn's car threw the wheel, and in trying to avoid Hearn, Sarles hit De Paolo. Sarles went up the bank, and over the top, crashing to the ground 25 feet below. The car caught fire and Sarles was pinned in the blazing wreck, the flames causing his death. His mechanic, C. V. Pickup, was hurled 40 feet through the air. His skull was fractured and he sustained body injuries. Hearn sustained possible internal injuries and cuts, and his mechanic, Ed Heffernan, was internally injured and his skull fractured.

August Second Greatest Month in History of Automobile Industry With Output of 272,000

NEW YORK, Sept. 15—With the figures 99 per cent complete, the National Automobile Chamber of Commerce reports that August production of passenger cars and trucks reached a total of 272,000, an increase of 12 per cent over July and 53 per cent over August of last year.

This makes this August the second greatest production month in the history of the industry, being topped only by June, 1922, with 289,000. May, 1922, had 256,000 and July 246,000. The following table shows the factory shipment figures for the first eight months of 1920, 1921 and 1922:

	Total Output				Carloads				Driveways				Boat			
	1920	1921	1922	1922	1920	1921	1922	1922	1920	1921	1922	1922	1920	1921	1922	1922
January	90,486	20,057	6,485	15,357	29,283	3,185	7,479	29,283	3,185	7,479	29,283	3,185	93	143	93	143
February	129,500	25,505	9,986	19,636	43,719	7,507	10,173	43,719	7,507	10,173	43,719	7,507	99	180	99	180
March	173,342	29,236	16,287	27,753	57,273	9,939	16,917	57,273	9,939	16,917	57,273	9,939	75	560	75	560
April	218,546	17,147	20,187	31,334	64,634	14,197	22,381	64,634	14,197	22,381	64,634	14,197	1,619	2,960	1,619	2,960
May	256,000	21,977	18,608	33,416	74,286	15,193	28,827	74,286	15,193	28,827	74,286	15,193	2,381	7,406	2,381	7,406
June	289,000	22,516	20,269	34,230	60,746	18,834	33,857	60,746	18,834	33,857	60,746	18,834	8,350	3,947	7,737	7,737
July	246,000	23,082	19,514	28,412	52,342	15,533	28,022	52,342	15,533	28,022	52,342	15,533	8,702	3,726	6,855	6,855
August	272,000	23,386	20,350	32,563	34,060	14,290	36,603	34,060	14,290	36,603	34,060	14,290	7,095	3,565	10,028	10,028

Factory shipments for the other months of 1920 and 1921 follow:

	1920	1921	1921	1921	1920	1921
September	20,804	20,150	24,431	12,550	5,469	3,580
October	17,209	17,323	14,127	11,257	2,519	2,300
November	13,253	14,061	9,497	10,509	659	1,385
December	11,802	12,100	6,469	7,500	89	134

Ford Financial Statement Shows \$289,935,296 Surplus

LANSING, Mich., Sept. 15—The annual financial statement of the Ford Motor Co., has been filed with the secretary of state. The statement is of June 30, 1922, at which time the company's surplus was \$289,935,296.40, while its holdings in the state of Michigan are valued at \$215,415,662.92. These figures show a decrease of \$49,456,560 from the surplus given in the company's statement filed in Massachusetts as of April 30, 1922.

The Michigan statement gives Ford's cash on hand and in the bank, \$145,885,669.31; plant, land, improvements, buildings, fixtures and structures, \$81,626,015.03; machinery, tools and equipment, \$39,531,079.34 and good will, \$20,517,985.82.

Included in the Ford statements are the returns from the Dearborn Publishing Co. and the Lincoln Motors Co. The assets of the former are listed at \$124,961.55, while a single item of \$250,000 cash is shown as the total asset of Lincoln Motors.

64 Miles to Gallon Made By Ford Speedster in Run

SAN DIEGO, Cal., Sept. 14—An economy run for Ford cars, divided into six classes, was held here Aug. 26 under the auspices of Powell's Ford Headquarters, Ford dealer, in which the winner covered a 48-mile course using only three quarts of gasoline, or at the rate of 64 miles to the gallon.

The winning car was a stripped speedster driven by E. M. Kelley of the United States navy. It was entered in the speedster class. Other classes and the greatest mileage record in each were the following: Class A, enclosed stock cars, without any but factory equipment, 47.63 miles to the gallon; Class B, open stock cars, 48 miles; Class D, specially equipped passenger cars, 47.92 miles; Class E, delivery cars, 38.16

miles; Class F, trucks, 36.51 miles.

The winner in each class was awarded a silver cup and a \$50 credit on a new Ford car. Prizes also were given for the six next best records in each class. There were 189 entries and it was required that each car be driven by its registered owner.

Number On and Amount Of, Payrolls Vary Little

WASHINGTON, Sept. 15—Comparison of employment in 40 identical automobile establishments during June and July showed an increase of 1.6 per cent in the number on the payroll but a decrease of 1.1 per cent of the amount of the payroll. The survey was taken on the basis of one week. The 40 establishments in June employed 104,889 and in July 106,619. The payroll in June was \$3,405,112 as against \$3,366,115 in July.

The figures of July 1922 compared with July of last year show that a number of persons employed in the automobile industry increased 21.5 per cent and the amount of the payroll increased 18.2 per cent, during the year. Forty-two establishments reported in July, 1921, and July, 1922. The number on the payroll in July, 1921, was 89,714. The amount of the payroll in July in 1921 was \$2,898,614.

Cleveland Tractor Co. To Manufacture Truck

CLEVELAND, Sept. 14—The Cleveland Tractor Co. will manufacture a ton and a quarter truck; the Zeeder passenger car that was scheduled to be made in the plant will be manufactured elsewhere, and Fred W. Ramsey, former president of the Cleveland Metal Products Co., one of the best known business men of the city and a power in local financial circles, has become chairman of the board of directors of the tractor company.

These important announcements were made today at the plant of the Cleveland Tractor Co. in this city.

Dealers Advised by A. E. A. to Prepare for Early Start of Christmas Selling Campaign

"Buy an Automotive Gift" Will Be Central Idea of Seasonal Movement Promoted by Merchandising Director Sherman

CHICAGO, Sept. 18—An early start on an intensive Christmas merchandising campaign for automotive equipment and service has been decided upon by the Automotive Equipment Assn., and Ray W. Sherman, director of merchandising, is preparing a series of bulletins to show dealers and garage proprietors how to get the greatest results from the undertaking.

"Buy an automotive gift for Christmas" will be the central idea of the campaign and the manufacturers and jobbers who are members of the A. E. A. will be urged to advise their dealer customers to display an attractive placard bearing these words. It is Sherman's opinion that dealers should make thorough preparation during November for this Christmas selling and be ready to jump into it intensively by the first of December. He advises a special appeal to women and says, "There is no reason why the department stores should forever be the one great mecca of the Christmas shopper."

Many suggestions and ideas for the planning and execution of the Christmas selling campaign are given in Number 3 of the Sales Executive, publication of which was recently commenced by Sherman.

One notable suggestion is that shop service can be merchandised for Christmas gifts as well as articles of equipment. "A paint job, a carbon cleaning job or any job for which a price can be

flat-rated beforehand can be sold as a Christmas gift," it is said. "The service gift could be a very neatly done authorization on the dealer's stationery, stating that Santa Claus had ordered the dealer to do the work required and that it would be done at the convenience of the receiver of the gift. This would make the money spent for gifts useful, which is what a lot of it is not. Many a man would rather have a set of spark plugs than a handful of wild neck ties."

Another suggestion is that many common replacement articles can be fitted into Christmas merchandising. For instance, a set of piston rings, brake lining, a timer, or other articles would be very acceptable to the man whose car is in need of such equipment.

A warning against stocking up with Christmas cartons is given. This is to guard against the possibility of having a lot of unsalable packages left on hand after the holiday season. It is stated that the best plan for Christmas goods seems to be to take standard merchandise and provide materials or a plan whereby the dealer can wrap the article in holiday paper and tie it with ribbon or colored cord.

The importance of Christmas decorations in the sales room is emphasized. It is advised that there should be a tree at least in every dealer's place. It is advised that complete cooperation of the sales force be brought about. The proper display of articles suitable for gifts is advised.

50 Cars to Be Seen at New York Enclosed Show

NEW YORK, Sept. 15—Fifty different makes will be represented in the enclosed car show of the Automobile Merchants' Association which will be held in Grand Central Palace Sept. 23-30. The spaces were auctioned off and there was lively bidding for preferred positions, participated in by nearly all of New York's dealers.

This will be the third annual show run by the dealers themselves and the second annual enclosed car show. This time the exhibition will be held in the Grand Central Palace, in which 53,000 sq. ft. of space have been secured on the main and mezzanine floors. Thirty-five exhibits of cars will be on the main floor. The admission fee will be 75 cents and it is hoped to break last year's attendance figures of 150,000.

TARIFF BILL PROTECTS INDUSTRY

WASHINGTON, Sept. 14—Protection for American automotive industry is assured in the conference tariff report as

submitted to the House today. One of the most important features of the tariff bill is the acceptance by the House conferees of the Senate amendment imposing a duty of 90 per cent foreign value upon automobiles, automobile bodies, automobile chassis, and parts thereof, exported prior to Feb. 11, 1919, from this country for the use of the American Expeditionary Forces, or for the governments associated with the United States in the war with Germany and which have been sold. The enactment of this provision will put a check to speculators taking unfair advantage of American producers and dealers.

TOLEDO MAKERS AT CAPACITY

TOLEDO, Sept. 15—With local automobile manufacturers working up to capacity many of the subsidiary parts plants have had to put on night shifts to take care of outside business.

Nine Toledo industries making parts have begun to deliver on contracts for the new Star car being assembled by Durant Motors, Inc. Most of the plants here have contracts calling for delivery of 200,000 units by the first of the year.

Ira Vail Wins Three Races at Philadelphia Fair

Brooklyn Dirt Track Driver in Duesenberg Does Not Break Record

PHILADELPHIA, Sept. 15—Ira Vail, of Brooklyn, kingpin dirt track driver in the east, in a wonderful showing with his Duesenberg won three races today, in the closing exhibition of the Philadelphia county fair at Byberry before an audience of 6,000 persons. The champion failed, however, to come up to the track record of 34 sec. flat, established by Lew Fink, of this city, last Memorial Day, in his Hispano. Last year Vail made the half-mile circuit in 34 and 17-100 sec., but his time was 34.53 slower in today's event. Vail had not raced here since last year. There were five events spread over the track so as to eliminate the dust and enable the spectators to have a good view at all stages of the racing. The events were under the sanction of the A. A. A.

The Brooklyn speed demon grabbed first honors in the time trials, the three-mile race and the five-mile free-for-all, and finished third in the handicap run. He was not eligible to compete in the fifth event for non-winners. The events follow:

Half-mile trials (fastest cars)—Won by Ira Vail, Brooklyn, Duesenberg, 34.53 sec.; second, Earl Vance, Philadelphia, Hispano, 34.89 sec.; third, W. J. Lazotte, Philadelphia, Hispano, 36.11 sec.; fourth, Charles Ganung, Katonah, N. Y., Dodge Special, 36.56 sec.

Three-mile final—Won by Ira Vail, Brooklyn, Duesenberg; second, Earl Vance, Philadelphia, Hispano; third, "Wild Bill" Albertson, Duesenberg, Pennyan, N. Y. Time, 3 min., 32.33 sec.

Five-mile free-for-all—Won by Ira Vail, Brooklyn, Duesenberg; second, Earl Vance, Philadelphia, Hispano; third, "Wild Bill" Albertson, Pennyan, N. Y., Duesenberg Special. Time, 6 min., 1.75 sec.

Five-mile handicap—Won by F. Wells, Newark, N. J., Duesenberg, 14 sec.; second, Earl Vance, Philadelphia, Hispano, scratch; third, Ira Vail, Brooklyn, Duesenberg, scratch. Winner's time, 6 min., 29.77 sec.

Five-mile race for non-prize winners—Won by W. Batten, New York, Duesenberg; second, Charles Ganung, Katonah, N. Y., Dodge Special. Time, 7 min., 11.61 sec.

ELECTRIC TRUCKS TO PARADE

NEW YORK, Sept. 14—With trucks entered by every electric vehicle dealer in the Metropolitan territory, and with more than 20 different users promising to participate, the success of the electric vehicle parade scheduled for Electrical Show Week in October is assured. It is expected that more than 100 vehicles will be in line. The parade will show the great variety of uses to which the electric is put in New York. The parade will be held on Tuesday, Oct. 10.

Bordino Wins Italian Grand Prix in Fiat at 86.8 M.P.H.

Completes 497-Mile Trial in Five Hours, 43 Minutes, Without an Engine Stop

MILAN, Italy, Sept. 15—(By Cable)—Bordino, driving a Fiat, won the Italian Grand Prix today over the Monza speedway, covering the 497 mi. at 86.8 m.p.h. His time was 5 hr. 43 min. 13 sec. F. Nazzaro, also in a Fiat, was second in 5 hr. 51 min. 45 sec. Viscaya in a Bugatti was given third place, although he did not finish, the crowd invading the track and stopping the race.

Bordino, who also won the 91 cu. in. race a week ago, went through without an engine stop, although two tire changes were necessary. He used Pirelli cords. Nazzaro experienced no tire trouble.

Of the 39 entrants only eight faced the starter, Bugatti withdrawing its team at the last moment, claiming its cars were not equipped with the right sort of wheels and tires for the race. This stirred up the crowd of 150,000 and the Bugatti drivers were threatened by the enthusiasts. Fiat offered to loan tires and wheels. This offer was accepted and the race delayed half an hour to permit of the change being made.

Only three cars finished. One Fiat broke its transmission at the starting line; two German Heims quit at half distance and two Diattos were out at the three quarters.

Bordino's fastest lap was made at the rate of 91.5 m.p.h.

The inner track, 2½ mi. round, was used. It is very similar in design and layout to Indianapolis, so interesting comparisons can be made. The last Indianapolis race at 500 mi., it will be remembered, was won by Murphy at 94.48 m.p.h. in an 183-in. car.

The prize list today totaled 300,000 liras. In this amount is included the Iron Crown of the Kings of Italy, valued at 20,000 liras. The crown, which goes to Bordino, is of gold, silver, iron and precious stones and was used for crowning the kings of Italy, Emperor Carlo Magno and Napoleon I.

A. S. A. HOLDS FIRST MEETING

NEW YORK, Sept. 14—The Automotive Service Association of New York held its first fall meeting at the Automobile Club of America on Sept. 7. Two motion pictures were shown, one subject being the care and adjustment of the Borg & Beck Clutch and the other the construction of the modern automobile, a film made by the Department of Agriculture and the Studebaker Corp. Fifty service managers attended and the meeting was conducted by the new general manager, John R. Eustis. The organization will hold its regular annual clam bake and shore dinner on Long Island Sept. 24.

LEASE ON ROW BRINGS \$500,000

CLEVELAND, Sept. 14—One of the biggest deals on Cleveland's automobile row took place when the Willys-Overland lease on sales and service quarters at 6604 Euclid avenue was sold to Frank N. Riley, local real estate operator, for a consideration reported to be \$500,000. Possession of the building is to be given the new owner of the lease as soon as the Willys-Overland people close a lease on new quarters.

GAS CAR STARTS WORK

LEACHVILLE, Ark., Sept. 16—The new gasoline passenger car for the Jonesboro, Lake City and Eastern Railroad Co. has arrived and is being operated between Jonesboro and Wilson. During the school months the car will be used for the transportation of students along the route to the Jonesboro Agricultural School. The car will also give access to Jonesboro during the day, as it will make several trips to and from that city.

FORDSON SHOW A SUCCESS

CHARLOTTE, N. C., Sept. 15—The Fordson Industrial Tractor Show held here for three days this week, has been largely attended and has proven a great success in every particular. During the three days 30,000 people attended the show, many coming from distant points. Joseph H. Holt, manager of the local branch of the Ford Motor Co., in charge of the show, said the "show has eclipsed all our hopes for it and has been two or three times greater than we expected."

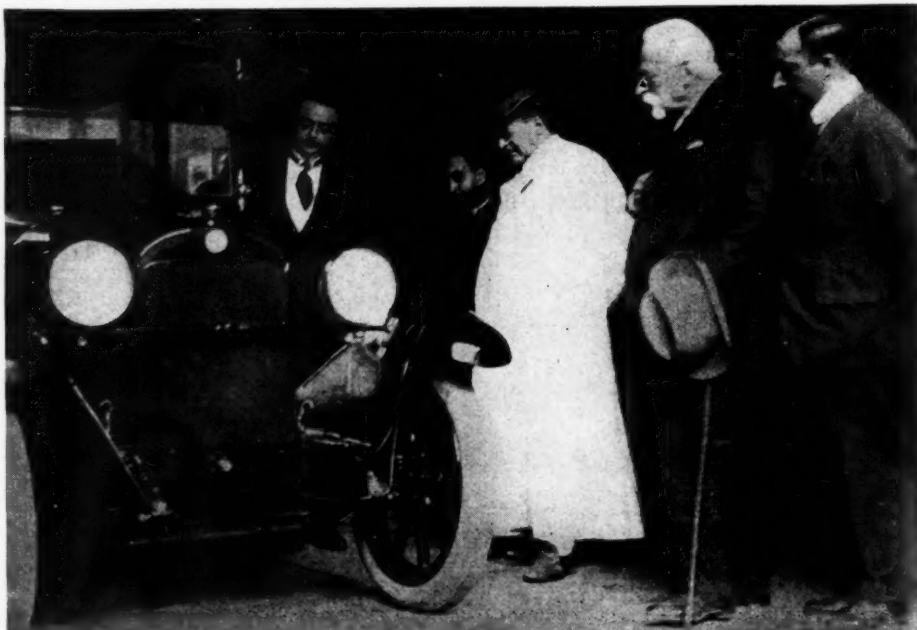
Illinois County Fairs Help Sales of Automotive Dealers

BLOOMINGTON, Ill., Sept. 14—The county fair season in Illinois, now nearing its end, has been highly advantageous to the automotive dealers. They have placed exhibits at these institutions more extensively this year than ever before, due to the bountiful crops in this state, the higher prices of all kinds of farm products and the general tendency of the farmers to spend money once more. Attendance at these fairs has been uniformly good and most of them report a record patronage.

Dealers in motor cars, trucks and tractors, have been quick to note the prosperous conditions everywhere existing in the country districts and the result has been that the display of automotive equipment has been proportionately large. Dealers report that their displays have attracted much attention and they believe that they can trace much new business this fall to their activities at the county fairs.

Now that the farmers are buying tractors once more, the dealers in this line are opening up their selling campaign. The big plowing matches in Kane county, known as the Wheatland and Big Rock, gave the tractor men an opportunity to talk their machines, and most of the manufacturers had a corps of demonstrators and salesmen on hand, looking up prospects and taking advantage of the presence of many thousand of the agriculturists.

Motor Car Finds a Home in the Vatican



ROME, Sept. 5—For the first time in history an automobile has appeared within the walls of the vatican as the property of the head of the Catholic Church. The car shown in the accompanying photograph, a Bianchi limousine, was accepted by Pope Pius XI as a gift

from the women of Milan, the diocese from which the Pope was elevated to his recent position. His Holiness is said to have surprised all the vatican attendants with his intimate knowledge of automobiles and his enthusiasm for sports.

August Sales in Southeast Make New Monthly Record

Buick Sells 200 Per Cent More Cars in Two Months

ATLANTA, Ga., Sept. 16—In spite of the fact that the railroad and coal strikes seriously retarded industrial operations over the entire Southeast during the past month, distributors here of the better known motor cars advise that sales during August were substantially larger than they have been in any single month for some time.

Practically all dealers in the larger southeastern cities are reported to have orders in hand from 50 to 100 per cent greater than they are able to supply. Distributors state that dealers are requesting cars for September delivery considerable above their quota.

Benjamin F. Ulmer, manager of the Atlanta branch of the Buick Motor Co., advises that Buick sales the past two months have been 400 per cent larger than the same period in 1921, and that dealers are asking for 200 per cent more cars than the company is able to supply.

INDIANAPOLIS SHOW BRINGS SALES

INDIANAPOLIS, Sept. 14—The Automobile and Accessory Show held in connection with the annual Indiana State Fair this week has been a sales producer for the car dealers, the truck men, accessory men and tractor equipment for industrial and agricultural uses. Sales in all lines began to be recorded the first day of the fair, which fell on Labor Day, generally more of a festive occasion than a large business producer.

At noon of the third day, Wednesday, more than 50 passenger car sales had been made to local and nearby residents of the state. Beside this there was said to have been a brisk sales business transacted by out-state dealers who were here in full force. During the next day more than 30 cars and trucks were sold according to reports that were far from complete, and there was great activity from early morning each day.

TRUCKS REPLACE RAILROAD

BLOOMINGTON, Ill., Sept. 15—Operation of motor trucks for transporting food, other supplies and United States mail, proved a life saver when train service on the Chicago and Alton at Roodhouse and Slater, west of here, was suspended for a week, due to the strike of train and engine men. These two cities have but the single railroad and, when the employees took exception to the presence of guards, found necessary to protect the non-union workmen, and also filed the claim that locomotives were defective, the road was tied up and both Roodhouse and Slater became isolated from the world, except by the connection made via the motor truck and bus, as well as the telegraph and telephone.

With the suspension of trains, a fleet of trucks and busses was placed in operation, handling the mail in and out of both cities to an adjacent point on another road where the mail could be exchanged. Food for Slater was handled by truck from Kansas City, a distance of 60 miles.

"Welcome Bureau" for Automobile Tourists

PHILADELPHIA, Sept. 14—A much-needed step for the welcoming of automobile tourists and other visitors to Philadelphia has been taken by the Keystone Automobile Club in the formation of a "Welcome Bureau," which began active operations on Sept. 1. The bureau distributes a packet of information as to traffic laws and so on, points of interest and road maps to each incoming party of motorists at hotels, department stores and tourists' bureaus.

FIGURES SHOW GAIN OF ENCLOSED

DETROIT, Sept. 14—The increasing popularity of the enclosed body automobile is revealed in statistics made public by the Cadillac Motor Car Co. These figures show that in the last eight years Cadillac production of enclosed cars has increased from 7 per cent of the total to more than 54 per cent of the total.

The increase has been a steady one, averaging a gain of nearly eight per cent each year. It covers the last six series produced by Cadillac. The greatest gain in enclosed bodies was from July, 1916, through June, 1917, showing a gain of 14 per cent.

WARNER BUYS NEW PROCESS GEAR

SYRACUSE, N. Y., Sept. 16—T. W. Warner, president of the Warner Corp., of Muncie, Ind., and Toledo, O., bought the New Process Gear division of the Willys Corp. at court sale. He was the only bidder and the price was \$1,904,000, which was \$4000 more than the court's upset price. The sale will come up for confirmation before Federal Judge Cooper in Albany Sept. 16. It is said that this Syracuse plant will become a part of the Warner Corp., which will be enlarged.

GARDNER PRODUCTION INCREASING

ST. LOUIS, Sept. 15—The Gardner Motor Co. reports a large demand for its new enclosed models and production has been continuing at an increasing rate through the summer. Heavy shipments have been made to the East and to the Pacific Coast. The southern market is reported just beginning to become active, with indications that the automobile business throughout the south will be better this fall than for a long time.

Campaign Against Short Measure Backed by N. M. A.

Loss of \$90,000,000 a Year by Gasoline Buyers Estimated by National Motorists' Association

WASHINGTON, Sept. 16—The campaign against short measure selling of gasoline is being supported by the National Motorists' Assn. The first shot produced results when 46 warrants were sworn out in Louisville by the Louisville Automobile Club against managers of filling stations, six of whom pleaded guilty and paid the fine of \$10 each that was imposed by Judge William Earl.

Charges made by the National Motorists' Assn. are that the average filching of short measure amounts to two pints in each five gallons, a daily loss to purchasers of 1,000,000 gallons, valued at approximately \$250,000, or \$90,000,000 a year. This is based on the assumption that each motorist buys two gallons of gasoline daily.

"No evidence has been found that the fraud is countenanced by the oil companies and in fact offers of assistance are being received from such companies," says the N. M. A. in its statement.

FATAL AUTOMOBILE ACCIDENTS INCREASE

DETROIT, Sept. 15—Seventy-six thousand accidental deaths is the astounding bill charged against Careless America in 1920, according to the report of the public accident statistics committee of the National Safety Council presented at the eleventh annual safety congress which was held here.

While the 1920 toll from all public and industrial accidents—is a decrease of 3,300 over 1911, the beginning of the decade, there is only a balance of 400 on the credit side of the ledger over the 1919 total. This record is viewed with concern by the nation's leaders of organized accident prevention since the yearly downward tendency of accidental deaths in the United States during the past decade, constant up to 1919, came to a halt in 1920.

Automobile accidents are held to be in part responsible for the unfavorable experience of 1920; in that year there were 1,200 more deaths from that cause than occurred in 1919. The chief reason for this, it is pointed out, was the large increase in the number of automobile users. The automobile fatality frequency for 1920 was 30 deaths a day, a total for the year of 11,000. The 1921 estimate of automobile deaths, based on figures now available from 50 of the largest cities, indicates a considerable increase over 1920. General traffic accidents in 1921, however, will show a 5 per cent decrease over 1920, it is believed.

Haynes Dealers See New Models at Factory Meeting

National Advertising Campaign Discussed—Engineers Point Out Features of Car

KOKOMO, Ind., Sept. 14—The new Haynes body models were exhibited for the first time here today at the first dealers' meeting held by this company in recent years. Dealer meetings are announced as a part of the policy of G. U. Radoye, who recently was placed in charge of both sales and advertising for the Haynes Automobile Co.

There were two topics for the meeting, the morning session being devoted to the national advertising policy behind the Haynes cars. On this subject, C. C. Parlin of the Curtis Publishing Co., and H. A. Groth of the Rankin advertising agency were the chief speakers. Opportunities for connecting local sales situations with the national advertising were discussed at considerable length. Groth called attention to an analysis of the United States by counties recently prepared by his agency and subject to call for any Haynes dealer or distributor who wished to make an intensive campaign of his territory.

Parlin discussed the economics of the present national crop and manufacturing situation and his conclusion is that as a result of the third bumper crop in successive years, and the recent rise in prices, the money is in the country and the dealers should be able to continue the present high rate of sales with less than the usual seasonal drops.

Radoye then presented a series of charts showing the strong sales points of the Haynes cars.

The afternoon session was given over largely to engineers who explained certain parts of the cars. This session had been arranged by Frank N. Nutt, the Haynes chief engineer. The speakers were C. N. Teeter of the Indiana Piston Ring Co.; B. M. Leece of the Leece-Neve Co.; E. R. Ross of the Warner Gear Co.; S. F. Dupree, Jr., of the Universal Drive Shaft Co.; Joseph Coulombe of the Byrne-Kingston Co.; and J. E. Duffield of the Whyte Motor Control Co. Clyde Jennings, managing editor of *MOTOR AGE*, spoke briefly on the human problems that enter into the work of the dealer. The meeting closed with the dealers on one side of the long table and the factory representatives on the other, with Radoye as umpire of the heart to heart discussions of the Haynes cars, the faults and good points.

The meeting was held under a large tent in a forest section of the farm of Alton G. Seiberling, vice-president and general manager of the Haynes Co. Wilbur D. Nesbit of the Rankin agency presided and Seiberling made a brief address of welcome. A good representation of Haynes dealers from all sections

of the country were present and they predicted many profitable meetings of this kind.

The list prices of the new models are: 5 passenger sport phaeton \$1,895; 7 passenger sport roadster, \$1,895; 3 passenger sport coupelet, \$2,195; 5 passenger sport sedan, \$2,695.

Wide Use of Chicago Trade Association's Legal Service

CHICAGO, Sept. 16—The value of the free legal service recently instituted by the Chicago Automobile Trade Assn. is shown by the fact that the day following the announcement of this service 25 members telephoned to ask questions. Many of these questions involved large sums of money. Among them were such as these:

"Can we hold the car of a party who owes us?" "Would you advise filing suit against this man who did thus or so?" "What is the state law regarding this or that?" "An officer came in and demanded that we pay another \$35 license on our service station. What shall we do?"

The manner of conducting the legal department makes it of value to all members, even those retaining their own attorneys. It does not attempt to handle cases in court, but the fact that it devotes its attention exclusively to the automobile trade enables it to answer immediately many pressing questions which a lawyer in general practice might have to study for a considerable time.

SCHRADER CO. CHANGES SALES

NEW YORK, Sept. 14—A. Schrader's Son, Inc., manufacturer of valves, gages, and other tire accessories, has changed its method of selling. Instead of marketing its products under a license agreement and certain price restrictions, it has adopted a system whereby Schrader goods will be sold direct to tire manufacturers and jobbers or through the Schrader company's consignees who will sell at the same price as the Schrader company.

WANT TO TAX GAS TWO CENTS

SACRAMENTO, Sept. 18—A gasoline tax of two cents a gallon, more rigid policing of the state highways, weight limit of 22,000 pounds for loaded trucks, and a graduated weight tax on all kinds of automotive vehicles, in addition to the present license fee based on horsepower, will be asked of the California State Legislature at its next session this fall, according to Drury Butler, chairman of the Highway Legislative Committee of the County Surveyors' Association of California, and county surveyor of Sacramento county. In conjunction with the State Supervisors' Association, and the California State Highway Commission, the county surveyors' organization has been working on a plan to provide adequate protection for the paved highways of the state, and a more equitable distribution of the cost of upkeep and maintenance of those highways.

Iowa Farmers On the Way Back to Automobile Market

Display in Connection With State Fair Largely Attended and Exhibitors Satisfied With Results

DES MOINES, Ia., Sept. 15—The annual Des Moines early fall show held last week in connection with the Iowa state fair demonstrated the fact that although the Iowa farmer is still a long ways removed from being the buying factor that he was before the financial bubble burst, he is on the way back.

Attendance at the show was the biggest in its history and interest was entirely to the satisfaction of the dealers and distributors who had space.

The state fair show is more than a Des Moines show, for more than 200,000 Iowans from outside of Polk county made their annual pilgrimage to the state fair, the total attendance for the fair being 359,000, which is approximately 60,000 above that of last year.

The fair show is controlled directly by the state fair association and is housed in Machinery hall, a big, semi-open brick and concrete structure. For several years the Des Moines dealers have given it wholehearted support. It is managed by C. G. Van Vliet, the veteran manager of the Des Moines winter show.

This year there were 34 lines of passenger cars shown, nine truck lines and 34 lines of accessories and automotive equipment. All three Des Moines tire factories had large exhibits.

One of the chief points of interest was the booth of the A. G. Graben Motor Co., where the new Star car was shown to Iowans for the first time. Another exhibit which attracted a large amount of attention was the Walker Turn Auto booth. The Marmon tear down exhibit was another attraction.

The Ford Motor Co. occupied not only all of the space in Power hall, but a space 200 by 250 feet in the open air, where all kinds of work was done with motor driven equipment. The entire Ford exhibit shown at the Chicago Pageant of Progress was brought to Des Moines for the fair.

There was some actual business done at the fair, which bore out the opinions expressed by conservative Des Moines distributors that there is a growing tendency toward buying cars at a price above that which has been the most popular in Iowa for several years. During the past 60 days there has been a noticeable increase in the number of registrations by cars other than Ford which up to that time occupied an overwhelming percentage of the registrations.

With but few exceptions, August was a banner business month for Des Moines distributors and dealers, keeping well up with July.

BUSINESS NOTES

The Lomar Mfg. Co., Middletown, O., manufacturers of the Lomar Shock Absorbers, has appointed W. M. Renick and Blair Pyle to distribute for them in the Cleveland territory under the name of The Lomar Cleveland Sales Co., 2009 Euclid avenue, Cleveland, O. A complete sales and service station is maintained there.

The Vim Sales & Service Co. has been chartered at Cleveland, O., with a capital of \$10,000 to operate a sales agency and service station for trucks, tractors and passenger cars.

Ernest Artzberger has purchased the Bettendorf garage, Bettendorf, Iowa, from Burkle Bros. and will lease it for auto repair purposes. A 200-acre Iowa farm was traded in for the business.

Wayne Avenue Garage & Motors Co., Philadelphia, engaged since April 29, 1920, in the manufacture and sale of automobiles, has filed a petition in the common pleas court for dissolution. The application is made by A. E. Shaw, president, and Ulysses G. Denster, secretary, with the explanation that the stockholders had decided to dissolve. There are no liabilities, it is stated.

The Atlanta branch of the Ford Motor Co. advises that actual gross sales at the Southeastern Fordson Industrial Exposition, held here recently, exceeded \$100,000 in signed orders obtained by dealers. Of this amount about 55 to 60 per cent represented Fordson tractors sold to industrial concerns; about 15 to 20 per cent sales for agricultural use, and about 25 to 30 per cent sales of other power farming machinery by southern distributors who had displays in connection with the exposition.

The Dayton-Wright Co., a corporation created under the authority of the state of Delaware, has been licensed to do business in Ontario. They are authorized to carry on the manufacture and sale of automobiles, trucks, tractors, farm implements and machinery.

Doss Rubber & Tube Co., of Atlanta, announces the addition of a new standard size cord tire to its line, the factory now being in production on this tire.

The Medina Rubber Co., Medina, O., successor to the Akron Universal Tire & Rubber Co., will continue under the direct supervision of the inventor, H. C. Keck, the manufacture of the Keck safety boot. This boot is now being manufactured of new tire fabric, rubberized inside and out, thereby making it moisture proof, it is claimed, and adding greatly to its appearance and wearing qualities.

With \$50,000 capital the Modern Truck Manufacturing Co. has been organized at Mobile, Ala., and will immediately establish machine shops for the manufacture of truck parts, according to G. M. Bryde, president.

The Chevrolet-Nashville Co. has been incorporated with \$50,000 capital at Nashville, Tenn., by A. W. Davis, H. A. Batchelor and Carroll Strohm. The company will distribute the Chevrolet in the Nashville territory.

TIRE AND RIM MEN ORGANIZE

CLEVELAND, O., Sept. 18—The Tire and Rim Association of America, Inc., has been organized to take over the activities of the Tire and Rim Association, which it supersedes. The new association seeks to enroll in its membership all the tire, rim, wheel and related parts manufacturers in the United States and Canada.

Officers were elected as follows: President, S. P. Thacher, United States Rubber Co.; vice-president, John Younger, Standard Parts Co.; secretary and general manager, C. A. Thompson; treasurer, H. W. Kranz. Offices are in the Leader-News Building, Cleveland.

TRUCK SHIPMENTS EXTENDED

CHICAGO, Sept. 16—Motor trucks have been placed in operation by the Northern Jobbing Co., a wholesale grocery concern here, to make hauls to Illinois, Wisconsin, Michigan, Indiana and Iowa towns. This move was inaugurated because of the railroad strike and it is the opinion of the traffic managers of the firm that this will continue even after the shop men have returned to work.

The Corrocan-Victor Co., of Cincinnati, manufacturers of automobile lamps, tool boxes and automotive devices, has opened a sales office in the General Motors building, Detroit, with L. K. Cohn in charge.

Lorne Tractors, Limited, is the corporate name of a new company which has been organized to engage in the manufacture of tractors at St. Thomas, Ontario. The authorized capital of the company, which has been granted an Ontario charter, is \$300,000.

Contract for the construction of new buildings at Leaside, Quebec, to cost approximately \$1,000,000, has been awarded by the Durant Motors, of Canada, Limited. The new plant will have a floor space of 500,000 sq. ft. and will be used exclusively for the maintenance of the Star car.

The Automotive Service Assn. of Brooklyn held its annual outing and clambake on Aug. 27 outside of Freeport, L. I. Over 100 attended and in addition to the regular program of sports the organization brought along its own jazz band made up of service manager members.

Harry E. Smith, formerly proprietor of an accessory store on West Broad street, Columbus, O., has purchased at receiver's sale a stock of parts and accessories from the United Auto Stores Co. and will head the Economy Auto Supply Co. at 37 West Long street. All of the stores of the United Auto Accessories Co. have been closed and the stocks moved to Columbus.

The automotive dealers of Kankakee, Ill., put on an extensive display of motor cars, trucks, tractors and accessories at the Interstate Fair there the week of Sept. 11 to 16. This is one of the largest fairs in Illinois and ranks closely with the state exhibition in importance and attendance.

The Mack International Motor Truck Corp. has opened a factory branch at 217 Twenty-first street, Toledo, which will be in charge of J. C. Smith, formerly manager of the St. Louis branch.

The Bingham Mfg. Co., chartered at Columbus, O., about eight months ago with an authorized capital of \$100,000, has been organized by the election of H. N. Bingham, president; F. E. Kocher, vice president, and G. P. Hinkle, secretary. The company has taken over a portion of the plant formerly occupied by the Immel Co. on East Livingston avenue, where a patented tractor and truck wheel will be manufactured.

The Motor Grinding Co., Milwaukee, is a new Wisconsin corporation with 500 shares of no-par common stock, organized to engage in general mechanical practice and repair work, principally on engines. The incorporators are Gustave R. Hoffman, L. E. Fichaux and M. E. Engle, attorneys, 120 Wisconsin street, Milwaukee.

W. H. St. John, 205 North Van Buren street, Green Bay, Wis., is reported to be contemplating the erection of a public garage, sales and service building, 48 by 102 ft., at Appleton, Wis.

Figures compiled by this house show that the average cost per mile on operation is fully 50 per cent less than rail shipments have been since the war. Light speed trucks will work on the roads for this company, as no heavy goods are handled.

Grocery dealers in towns supplied by the company were writing that certain commodities could not be found in the town at all. One town in Wisconsin complained that "not a bar of soap is to be had" and so the motor truck whizzed out with a shipment.

EXPECT GOOD FALL BUSINESS

SPRINGFIELD, O., Sept. 15—Manufacturers of motor trucks, automobiles and rubber tires in Springfield are optimistic regarding future business. They say that they expect a most substantial revival of business this fall and winter. E. H. Gilcrest, vice-president of The Westcott Motor Car Co., says that the production at the plant will be increased the middle of September to a point that will make the output during the fall months the largest during any similar period in the company's history.

Gear Manufacturers at Cleveland Continue Work

Campaign for Standardization of Gears Is Carried On

CLEVELAND, Sept. 16—Shortly after moving its headquarters from Philadelphia to 2443 Prospect avenue, this city, the American Gear Manufacturers Association renewed its efforts for the standardization of gears.

F. W. Sinram, president of the Van Dorn & Dutton Co. of this city, is president of the association, and he stated that rapid progress has been made in the last six years in the matter of standardizing gears. The Society of Automotive Engineers and the American Society of Mechanical Engineers have been working with the organization to reduce the number of styles of gears and gear elements.

Cleveland's geographical location and the fact that executive officers may reach so many manufacturing centers after a day's or night's ride is what brought about the decision to locate headquarters here.

T. W. Owen is in charge of the headquarters as acting secretary. Other officers of the association are: R. P. Johnson, first vice-president of the Warner Gear Co., Muncie, Ind.; B. F. Waterman, second vice-president, of the Brown & Sharpe Mfg. Co., Providence, R. I.; C. F. Goedke, treasurer, of the William Ganschow Co., Chicago.

The association was organized in 1917 and Sinram has been its president since that date. The annual convention of the organization will be held in Chicago on Oct. 9 to 11.

RAILROAD LOADS MORE AUTOS

DETROIT, Sept. 18—Car loadings of automobiles for shipment by the Michigan Central Railroad from Detroit plants this year have far exceeded all past records, according to comparative figures formulated by E. D. Bronner, vice-president in charge here.

A total of 55,045 carloads of automobiles were loaded in the first eight months this year, as against 25,724 in the same period of 1921, at the Detroit stations of the Michigan Central, an increase of 114 per cent.

August, 1922, was the banner month of history, with loadings of 8557 carloads of automobiles, topping even the five preceding months, each of which passed the 7000 carload mark.

PLAN 1000 ELWOOD TRACTORS

MILWAUKEE, Wis., Sept. 18—The Elwood Tractor Co., Madison, Wis., manufacturer of tractors and engines, has taken over the business of the Paris Mfg. & Engineering Co. of Paris, Ill., and is moving its entire works and headquarters to Paris. A production schedule of 1000 Elwood tractors in 1923 is planned.

IN THE RETAIL FIELD

Sehorn & Hipp, Charlotte, N. C., Chevrolet agents for the Charlotte territory, have dissolved copartnership, Louis M. Hipp selling his interest in the firm to S. E. Sehorn, who becomes sole owner of the business.

Courtney & Cannon, Inc., have been chartered to do a general automobile truck and tractor business at York, S. C. Capital stock is \$20,000.

The Charlotte Automotive Trade Assn., Charlotte, N. C., announces that the Carolina Automobile Show will be held in Charlotte some time during the month of February. No specific date for the show has been set.

The Cutting Larson Co., Inc., New York, eastern distributors for the Oldsmobile, has moved into its new eight story Oldsmobile building at 311-323 West Sixty-sixth street, near West End avenue, New York.

The Templar Motors Co., of Cleveland, has opened a sales room and service station under the direction of the factory at Broad and Spring Garden streets, Philadelphia. The local concern trades as the Templar Sales Co.

J. A. Werachowski, Arnott, Wis., is a new Buick dealer.

The Oconto (Wis.) Motor Sales Co. has been appointed Maxwell and Chalmers dealer for Oconto city and county. It already is Reo dealer.

The Motors Service Co. has been organized at Wilmette, Ill., and articles of incorporation issued with capital stock of \$10,000. A garage and sales agency will be opened at 721 West Railroad avenue. The promoters include A. S. Van Deusen and J. C. Slown.

The Nash Sales Co., 481 Broadway, Milwaukee, which on Sept. 1 took over the retail franchise on the Nash line in Milwaukee county and vicinity, has also been appointed distributor and local retail dealer in the La Fayette, the wholesale territory comprising all of Wisconsin. Alfred Reeke, who has gone to Cleveland, O., as distributor of the Nash and La Fayette, formerly handled the retail franchise of both lines in Milwaukee county.

I. H. C. to Build Three New Service Stations in Chicago

CHICAGO, Sept. 15—Having found it necessary to increase its truck sales and service facilities in Chicago, the International Harvester Co. has decided that instead of concentrating in one large station it will add three stations, making a total of four with the one now in operation. The present station is at 1814-16 South Michigan avenue, on "automobile row."

It was found that the convenience of the many International truck owners in Chicago would be served better by the establishment of service stations in widely separated localities and therefore three new service stations, each having approximately 20,000 square feet of floor space, will be built. They will be at the following locations: Diversey boulevard and Clybourn avenue, to serve the north and northwest sections of the city; Western avenue at Marshall boulevard, to serve the west and southwest sections, and Racine avenue and 121st street, to serve the extreme south sections. The present station will serve the loop district and the near south side. The combined floor space of the four stations will be about 80,000 feet, four times the area of the present station.

Each station will be equipped with modern machinery and will be operated by factory trained mechanics. There will be a salesroom at each station with room to display the full line of 12 Interna-

C. G. Cummins, dealer and distributor for Hupmobile at Sioux City, Ia., will move from his present location on Douglas street about Jan. 1. More commodious quarters, made necessary by expansion in business, have been secured at Eighth and Pierce streets.

Ralph C. Schwimm will open a parts and accessory business in the Davidson block, Sioux City, Ia., about Sept. 15. A full line of replacement parts for popular cars will be carried.

Patton & Gay, Inc., have established a new retail tire store at 15 West Baker street, Atlanta, handling several well-known makes, but specializing in the Kelly-Springfield line.

The Bacon Motor Co., of Miami, Fla., Studebaker distributors in that district, plan the construction this year of a sales building and service station entailing an investment of about \$85,000.

Tampa Cadillac Co. has been organized and incorporated with \$50,000 capital at Tampa, Fla., and established a distributing agency there for the Cadillac.

The Hinderson Garage, Sarona, Wis., was totally destroyed by fire Sept. 6. The owners plan to rebuild at once.

Herrman Motor Car Co., 680 College avenue, Appleton, Wis., has let contracts for the construction of a two story fireproof sales and service building, 80 by 89 ft.

E. H. Ramm, New London, Wis., who has maintained a branch of his hardware, implement and motor car business at Clintonville, Wis., for some years, will build a new store, garage, warehouse and service building, 50 by 120 ft., during the coming winter.

The Bachman Motor Car Co., Milwaukee, distributor of the Dort and Stephens, announces the appointment of S. S. Morehouse as retail sales manager in Milwaukee county.

William Love, who handled Packards at Toledo until a few months ago, has become the distributor for Rickenbacker cars and Standard trucks. H. C. Bulask, Toledoan, who has been in Cleveland with Packard for four months, will be sales manager.

tional trucks ranging from 2,000 to 10,000 pounds capacity. Each station will provide free inspection, by factory trained inspectors, at regular intervals of trucks in the hands of owners. There is no time limit to this service.

ROLLS-ROYCE TO MAKE 750 A YEAR

SPRINGFIELD, Mass., Sept. 14—A circular to preferred stockholders of Rolls-Royce of America, Inc., states that since the reduction in the price of the chassis in March sales have increased so fast that at the present time the company's unfilled orders are such as to tax the capacity of the plant for the remainder of the year.

With the present equipment the company can turn out 10 cars a week and it is stated that with a comparatively insignificant capital expenditure for equipment the output can be raised to 750 cars a year, which the company thinks can be easily sold under ordinary business conditions.

ANDERSON PRICES REDUCED

ROCK HILL, S. C., Sept. 15—Prices of the various models of the Anderson car have been reduced as follows:

	Old Price	New Price
5 pass. phaeton	\$1650	.....
Convertible roadster	1650	\$1495
7 pass. phaeton	1795	1495
4 pass. sport	1750	1595
4 pass. sport special	1850	1595
2 pass. speedster	2195	1785
4 pass. ultra sport	2395	1945
4 pass. coupe	2450	1995
5 pass. sedan	2550	1995

25-Mile Motorcycle Race Won in 25 Min. 22 2-5 Sec.

Rocky Mountain Championship Goes to Jack Greene, Riding An Indian

DENVER, Sept. 14—The Rocky Mountain motorcycle championship was won at Overland Park yesterday by Jack Greene on an Indian, who covered 25 miles on the one-mile dirt track in 25 minutes, 22 2/5 seconds against a field of speed kings from five states. Besides the News-Times championship cup awarded in this main event of the full afternoon program, the California boy also captured first prize in the five-mile sidecar event in 6:3 1/5, second place in the ten-mile sidecar race and third in the five-mile solo event. The program was full of thrills, and was witnessed by a crowd estimated at 40,000 people, who filled the grandstands and stood from five to 25 deep all the way around the outside fence of the course. Among the race fans were hundreds of motorists from all parts of America, who were camping in Denver's free municipal camping ground in the park.

The other events were: One-mile trial, Hugh Murray, 54 4/5 seconds. Five-mile open professional (solo), O. C. Lovette first and Hugh Murray second; 4:41. Ten-mile solo, Johnny Krieger, O. C. Lovette, Leslie Parkhurst, 9:10 4/5. Five-mile sidecar, Greene, Grieger, Paul Warner; 6:03 1/5. Another ten-mile solo (reduced from 15 miles by agreement), Parkhurst, Lovette, Warner; 9:25 4/5. Ten-mile sidecar, Krieger, Greene, Warner; 10:10 2/5. In the 25-mile championship event, Warner and Krieger took second and third places respectively. The meet was staged by the Rocky Mountain News and Denver Times.

MOVE TO REFINANCE H. J. WALKER

CLEVELAND, Sept. 14—In an effort to increase the working capital of the company, directors of the H. J. Walker Co., makers of automobile engines, have mailed a circular letter to stockholders in which they announce that 75,000 shares of no par common stock of the company heretofore authorized but not issued will be offered for sale at \$5 a share.

It is stipulated that subscriptions may be made by stockholders of record of Sept. 5 at that price and the time limit for such purchases is Sept. 15, 1922. The stipulation also is made that subscriptions will be made and accepted subject to the working out of arrangements, satisfactory to the board of directors, bondholders and creditors of the company and subject to the disposition of such an amount of common stock as shall be adequate to permit the resumption of operations.

CONCERNING MEN YOU KNOW

J. M. Dixon and N. E. Oliver have been appointed directors of the Quaker City Rubber Co. Dixon is president of the Tobacco Products Corp. and director of many other large corporations. Oliver was also elected vice president, the appointment becoming effective immediately.

R. S. Beane, who formerly operated in the south for the Sparks-Withington Co., has been made southern district manager for the Hinckley-Myers Co., Jackson, Mich., which manufactures automobile tools and equipment. Beane has been connected with the industry since 1907.

F. D. Schulte has resigned as body engineer and designer of the Stephens Motor Car Co., Freeport, Ill. His plan is to take a three or four months' vacation trip to Europe. After returning to the U. S. A. his plans have not been announced.

A. F. Bassett has been appointed assistant sales manager of the motor bearings division of the Hyatt Roller Bearing Co., Detroit. Bassett is a graduate of Yale Sheffield school and has been connected with the sales and engineering divisions of the company. Recently he has been sales engineer for the Detroit territory.

S. M. Williams, who for several years was in charge of the work of the Federal Highway Council in Washington, D. C., and who joined the Autocar Co., Ardmore, Pa., when the Federal Highway Council was abandoned, has been appointed manager of the New York city branch of the Autocar Co.

Earl W. Webb has been placed in charge of the Detroit office of the legal department of General Motors Corp., succeeding James McEvoy, now in charge of the patent section.

Earl B. Stone has joined the staff of Hoyt's Service, Inc., advertising agency, at its Cleveland office. Stone has had a very extensive sales and advertising experience for nine years, the last

three and a half of which he spent with the Cleveland Tractor Co. as road salesman, assistant advertising manager, district sales manager and advertising manager.

John N. Willys, president of the Willys-Overland Co., New York, has returned from a two months' visit to Europe. Willys, in anticipation of stiff competition abroad because of the tariff, has planned increased production in his English plant at Manchester.

William R. Grundman has severed his connection as service and general manager of Walter S. Halliwell, Inc., handling Mercer and Moon cars and the Winther truck in East Hartford, Conn., to become associated with the road test department of Mercer Motors Co., Trenton, N. J.

George E. Sherman has resigned as manager of the truck department of the Chicago branch of the Ford Motor Co. and has taken the management of the Wright-Kenderdine Co., 1111 North Clark street, Ford and Lincoln dealers on the Chicago north side. Sherman organized the first truck department in any of the Ford branches.

C. G. Atwood, pioneer distributor of Overland cars in northwestern Ohio and of late years head of the battery sales for Presto-Light in Toledo, has joined the Cadillac-Toledo Co. as a salesman. He is also head of the Toledo Auto Shows Co., which will have charge of the annual spring show.

Lynn Bloomfield, Galesburg, Ill., distributor of the Mitchell car, had a narrow escape from death when shot in the head by a hunter who did not see him. Bloomfield was also engaged in hunting and while walking through a field he was shot by an unknown man, who stopped by the roadside to shoot at a dove. Some of the leaden pellets struck Bloomfield and lodged between the bone of the skull and the membrane covering the brain tissue.

RECEIVER'S SALE OF URSUS CO.

CHICAGO, Sept. 14—The receiver for the Ursus Motor Co. has advertised that written bids will be received until 10 a. m. Sept. 28 for the company's manufacturing plant at 6601-33 West Grand avenue, Chicago. The plant was erected about two years ago, at a cost of \$165,000 for building and 15 acre site, for the manufacture of trucks, but was never operated to any extent.

SUMMER AUTOMOBILE SHOW

WILMINGTON, Del., Sept. 17—A successful summer automobile show was staged last week here, in connection with the Delaware State Fair. The exhibitors were Wilmington dealers, and nearly all of them were represented, as were also some accessory men. One of the features was one of the new Star cars, a Durant production.

"TRAINLOAD BILL" ARRIVES

KALAMAZOO, Mich., Sept. 14—"Trainload Bill" is in town. The possessor of this euphonious cognomen is none other than William Elliott Phelps, the new general salesmanager for the Barley Motor Car Co. Until August 1 he was general salesmanager of the Haynes Automobile Co., Kokomo, Ind., and it was through his merchandising activities in moving large shipments of cars that he was able to gain the title awarded him.

Phelps' connection with the Barley Motor Car Co. will mark the introduction of a new six cylinder car by the manufacturers of the Roamer. The new car will be known as the Barley and will be priced under \$1,400.

RICKENBACKER FINANCING CO.

DETROIT, Sept. 15—Rickenbacker Co., Inc., has been formed as a financing company for the Rickenbacker Motor Car Co. and will handle all financial business of the manufacturing company. This, according to B. F. Everitt, president of the manufacturing company, applies to the handling of sales and such other business as may arise from time to time.

The capital stock of the financing company is \$100,000 at \$10 a share; \$10,000 paid in cash.

\$3 UPKEEP FOR 28,000 MILES

STOCKTON, Cal., Sept. 14—J. P. Stull, who operates a rural mail route between Stockton and the Jenny Lind district, believes he has broken the world's record on upkeep for the car he uses in distributing and picking up the mail. He has driven this car, a Studebaker Light Six, 28,000 miles, and his total upkeep cost has been \$3. The original tires are still on the car, which is used every day except Sunday and national and state holidays, and travels over some of the worst roads in California.

HUGE FRANKLIN DRIVEAWAY

SYRACUSE, N. Y., Sept. 16—Following a visit to the factory of more than 200 dealers from 24 states and Canada, there was a record driveaway of Franklin cars of the new series just announced. Representing a retail value of \$7,000,000, there were 250 cars in the parade through the city that marked the start of the driveaway, the largest single day's movement of cars out of the plant of the Franklin Automobile Co.

Sherman and Stranahan Address Eastern Jobbers

A. E. A. Men Explain Merchandising Campaign Plans at Atlantic City Meeting

ATLANTIC CITY, Sept. 14—Automotive equipment business along the Atlantic seaboard is running ahead of last year, according to informal reports made by jobbers attending the fall meeting of the Eastern Automotive Equipment Assn. New England jobbers reported the biggest increase in business, in some cases running as high as 30 per cent, in dollars and cents over last year. The Pennsylvania and New Jersey districts also reported good sales. In the New York city territory jobbers have had little, if any, improvement over the business in 1921 and competition, particularly on a price basis, has been keener than previously.

The meeting, presided over by Wallace G. Page of the American Motor Equipment Co. of Boston, president of the association, was addressed informally by Robert A. Stranahan, chairman of the merchandising committee of the Automotive Equipment Assn., and Ray W. Sherman, merchandising director of the same organization.

Stranahan urged constant campaigning by jobbers to assist dealers in getting more rapid turnover of goods as the most important requirement in the process of building up business. "Help dealers to become better merchants and they become better credit risks," he said. He put emphasis upon development of retail selling plans for the use of the dealer as the biggest task of jobbers today.

Sherman talked with the jobbers about local and district arrangements for presentation of the "Ask 'em to Buy" and "Shop Profits" films and about holding sales promotion meetings.

It developed that jobbers in the New England territory co-operatively have a sales promotion campaign well under way in connection with the Automotive Equipment Assn. movement. Plans are being developed in Pennsylvania, New Jersey and some of the other eastern territories.

ENCOURAGING THE TOURIST

VANCOUVER, B. C., Sept. 15—A new tourist camp has been prepared in this city for visiting motorists and is already being extensively patronized. One hundred and sixty acres have been set aside for this purpose, for the accommodation of 200 automobiles and tents, all parking spaces being under the shelter of trees. Cooking and dining shelters, each with a large cook stove and dining tables, have been built in different parts of the ground, with shower baths, laundry facilities and every other convenience. A bungalow is also provided for social purposes.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

A Broken Wire May Ruin the Ford Generator

Q—We have a Ford car which has developed a perplexing electrical trouble which we are unable to locate. The battery terminals have been cleaned and the starter works and cranks the engine but neither the head nor tail light will light up and the generator will not charge the battery. The generator cutout was taken apart and while the points appear to be in good condition there is about $\frac{1}{2}$ inch of insulation burnt off the wire running from the bottom point to the coil. We removed the cutout from the generator and connected a wire from the generator terminal to the frame of the engine but got no spark. The commutator was recently sanded. Would this show that new brushes are needed? What is the trouble and how can it be remedied?—Chas. M. Saylor, Columbus, O.

1—From the symptoms, we believe that there is a broken wire somewhere between the starting switch and the generator. The starting circuits are obviously O. K. or the starting motor could not crank the engine. From the battery side of the starting switch a small wire goes to a junction block on the front of the dash on the left side of the car. From this junction block another wire goes to the ammeter and from the ammeter a wire goes to the cutout.

To test these wires, a simple method is to use a piece of lamp cord about six or eight feet long. Care should be taken to see that there is no gasoline lying around as this method involves flashing to determine which wires are dead and which are alive.

To start with, make a connection at the battery side of the starting switch with one end of the lamp cord and flash the other to the frame of the car, and as the starting circuit is described as being O. K. you should get a flash on this test. Next, test the small wire which goes from the starting switch to the junction block by flashing from its terminals to the frame, first at the starting switch, then at the other terminal up at the junction block. If the junction block end of this wire is alive next flash from the ammeter to the frame of the car and then from the ammeter terminal and finally flash the battery wire on the cutout to the frame of the car. The break or opened circuit will be in between the last place where a flash is obtained and the first place where there is no flash.

A condition of this kind usually causes a great deal of trouble, for the generator operates without being connected to the battery and usually burns up the output and possibly its own field and armature. Accordingly if you find the break in the wiring and then repair it and find that the generator does not charge, it will probably be necessary to take it to a Ford station having a capable electrician

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

or to any electrical service station known to handle work of this kind, as testing armature fields and cutouts is a business in itself requiring special training and long experience. If the generator will charge, however, after the break in the wire has been repaired and by holding the cutout points together it shows that the only thing required is a new cutout.

FORD HORN NOT SUITED FOR OPERATION FROM BATTERY

Q—Publish in next Motor Age whether or not a motor driven battery horn that will sound from the Ford regular six volt battery is regular Ford factory equipment anywhere in the U. S.—John Quillico, Red Lodge, Montana.

The alternating current horn as supplied in your territory is the regular horn equipment on all models of the Model T Ford anywhere in the United States. A battery operated or motor driven horn is not factory equipment and where installed has been done by agent or owner.

LIVE AND LEARN

There is a story told about a mechanic and tool maker of the old school which illustrates our position. In the large factory in which he was employed there was no man more dependable when it came to the point of handling a difficult mechanical job and yet in spite of his vast practical experience he often ran up against a snag of some sort and his favorite remark was,

"De longer I live

De more I do' no."

This expression of the old time mechanic expresses our position rather concisely for while we are endeavoring to get all possible information to give to our readers in their time of need we also appreciate that we can both receive as well as give people information. We are accordingly, very grateful for a letter received from Mr. A. L. Dennis of the Auto Electrical Service Station, Rockville Centre, N. Y., which is as follows:

"In reference to the trouble that Mr. Edward G. Fritz of Oklahoma City is having with a Hudson generator (see page 43 of the Aug. 10 issue of MOTOR AGE) would like to say we have had the same experience several times and found the cause to be in the slipping of the generator clutch. If Mr. Fritz will remove the generator brush cover and watch the armature and the pump shaft at the same time he will be able to see by the difference in speed whether there is any slipping action occurring, as slipping will allow the pump shaft to turn much faster than the armature. If this is the case we would recommend installing a new clutch as this would be the most satisfactory way to make a repair. Please don't think I am trying to tell you people your business, I am suggesting."

Our reference to the first part of this article to the humble attitude of the old time mechanic was prompted by the last part of Mr. Dennis' letter, as while we may not at all times agree with the opinions of our readers we are nevertheless, very glad to hear from them and whenever we may have overlooked some possibility we are only too glad to receive helpful suggestions.

MAKERS OF VACUUM TANK

Advise where the Zorzi vacuum tank is manufactured and where parts can be obtained.—Kann & Son, Fifth and Brown Sts., Lafayette, Ind.

The tank referred to is manufactured in New York by the Zorzi Corp., 1737 Broadway. A factory agency is maintained at 326 W. Madison St., Chicago, spare parts for some models can be obtained from the Chicago agency.

Salesroom in Narrow Building

Q—We are enclosing a small sketch of our new salesroom. Will you kindly advise a suitable plan for this salesroom? We have a very narrow alley which is ten feet wide in the rear, and we have no front opening to drive cars in. Our air station is located under the stairway, as shown in the sketch.—Williamson-Lexington Co., Williamson, W. Va.

This is a most unusual layout and we would ordinarily say that it would be quite impossible to make a good or even fair salesroom arrangement on a lot so narrow. The bay window effect is a decided advantage and we would recommend carrying it even a little further as suggested by the dotted line, in that way being able to display the whole side of a car.

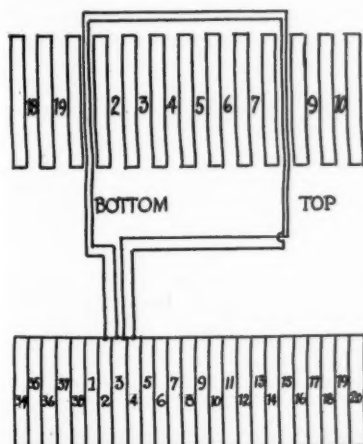
You have the manager's desk up in a front corner and the stenographer in the rear. You will find it more convenient to put both desks together behind a small enclosure close to the showcase and parts room; then the stenographer can watch the counter. The manager probably will not spend a great amount of time at his desk but at any rate the windows are too valuable to waste displaying him when there are cars to sell.

You must place your air and water as far as possible from the gas pump so that cars stopping, for air will not obstruct the pump. The narrow alley at the rear will be a handicap. Altogether this building is not in the least fitted for automotive purposes and rather than spend much altering it, we would suggest finding a more suitable place, one at least 50 ft. wide.

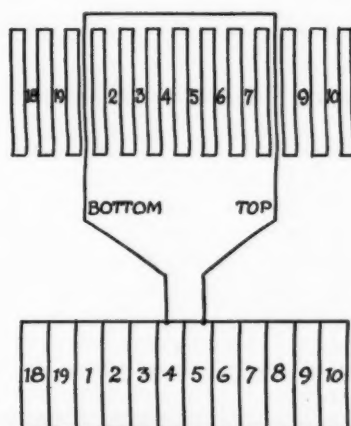
BUICK-McLAUGHLIN ARMATURE DIAGRAM

Q—Publish armature wiring diagram of Model D 35 McLaughlin.—Barrington Motor Works, Halifax, N. S.

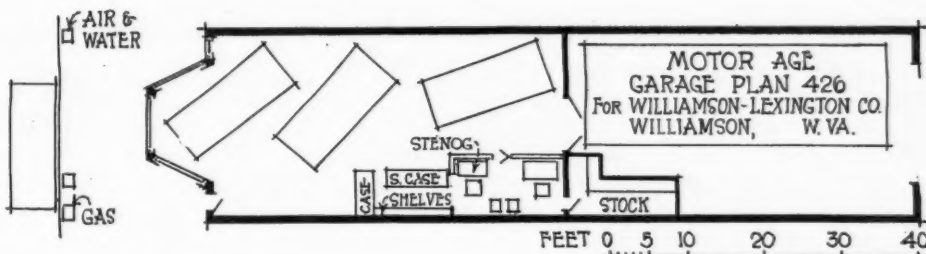
1—The two diagrams below give the internal circuits of the armature, one showing the generator portion and the other showing the starting motor portion. These apply to Delco motor generator type 94 and 115, which were used on both the McLaughlin and Buick cars.



ARMATURE DIAGRAM, GENERATOR PORTION ONLY FOR MODEL D-35 McLAUGHLIN AND BUICK MOTOR GENERATOR TYPE 94 & 115 100746



ARMATURE DIAGRAM, STARTER PORTION ONLY FOR MODEL D-35 McLAUGHLIN AND BUICK MOTOR GENERATOR TYPE 94 & 115 100747



Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelli-

gent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

LOOK FOR DISTORTED CYLINDER BLOCK ON THIS JOB

Q—We have experienced an unusual and apparently unaccountable problem in the cracking of 490 Chevrolet cylinder head. We have had so much of this that we are led to believe there must be some definite cause and yet we are unable to find it. Right now we have two cars on hand, with similar cracked cylinder heads.

In each case, they have cracked in the exhaust manifold port, sometimes at the top and sometimes at the bottom, but usually at the top. We have not succeeded in getting them welded satisfactorily. The trouble seems to have occurred on cars which have run several seasons and once the original head cracks, it seems impossible to get a new one even to stand. Both of the jobs mentioned above have been thoroughly overhauled, bearings tightened, valves ground, motor timed, fresh oil, pump working and everything apparently O. K., yet the heads only last a few weeks, before cracking in the exhaust manifold port, thus allowing water to enter cylinders. Perhaps you have had occasion to study this problem and can throw some light on it for us.—The "Service" Garage, Amelia, Va.

1—We have consulted the local Chevrolet service station and have been informed that they have never encountered trouble such as you have experienced. Reference to our files regarding the Chevrolet car shows no great amount of trouble due to cracked cylinder heads. We believe, therefore, that the following points of the engine on which the heads have cracked, should be carefully checked; move cylinder head and scrape all traces of shellac or accumulation from top of cylinder block.

Then, using a very rigid straight edge, which should be not less than 1/2 inch thick and not less than 1/2 inch wide, lay it across the cylinder head longitudinally, that is, parallel with the length of the cylinder. Sight under straight edge and note whether any air spaces exist between straight edge and cylinder head. This test should be made at several points on the length of the cylinder head and if any appreciable air-gap is noticeable, it is indicative that the cylinder head casting has distorted. The straight edge should be also used at right angles on the head, that is, across the short dimension.

Installing Winton Engine in Ford Chassis

Q—We are contemplating installing a six-cylinder Winton engine into a Ford chassis by taking off the body and putting some truss rods under the frame. Do you think the regular Ford differential is strong enough for this engine?

1—The regular Ford differential will be overstressed if used in connection with the Winton Six engine. We would not recommend the use of the Ford differential, neither would we advise the installation of the Winton engine in the Ford frame.

2—Tell all the necessary things that I would have to do. I want a car with plenty of power. Power is what we are after, and not speed. The engine we are thinking of installing is an old engine but has never run very much. We believe it is about a 1912 model.

2—If you intend using this engine it would be best to install it in the Ford truck chassis using either the standard Ford truck rear axle or a bevel gear drive axle of larger capacity than the Ford model T. Truss rods will not be sufficient to give the necessary strength to the Ford model T frame if this engine is installed as it will weigh approximately 700 pounds.

3—Give instructions for adjusting carburetor.

3—An illustration of the Winton Stromberg carburetor is shown in Fig. 1. To adjust the carburetor, first adjust the lock nut (N) so that the auxiliary air valve seats lightly, then turn from two to five notches further up for additional tension. See that the adjustable nut (M) on top of the auxiliary air valve stem clears the secondary nozzle lever (L) not less than 1/64 of an inch (it will usually be found that this adjustment will be about right between 1/64 and 1/32 of an inch clearance), then turn the adjustable nozzle stem (R), to the right until it is seated, then back to the left from 1/4 to 3/8 of a turn and start the engine. Open or close this nozzle until the engine idles properly. This valve stem has a fixed opening, and when seated is as nearly closed as possible.

Advance the spark, and open the throttle wide, and if the engine lacks gasoline on high speed, move down the adjustable nut (M) on top of the auxiliary stem; if too much, turn it up.

The gasoline level is adjusted by the priming stem (C) and lock nut (E) on the top of the float chamber. Turning this stem down lowers the level, and turning it up raises it. This, however, usually requires no attention, as it is properly adjusted at the factory. The gasoline level in the float chamber should be about 1 inch from the lower edge of the glass.

To start the engine close the valve (D) in the fixed air inlet horn. This usually will be found sufficient to enable the engine to start readily. In very cold weather, use the priming stem on the top of the float chamber; but in using this, be careful that you do not raise the

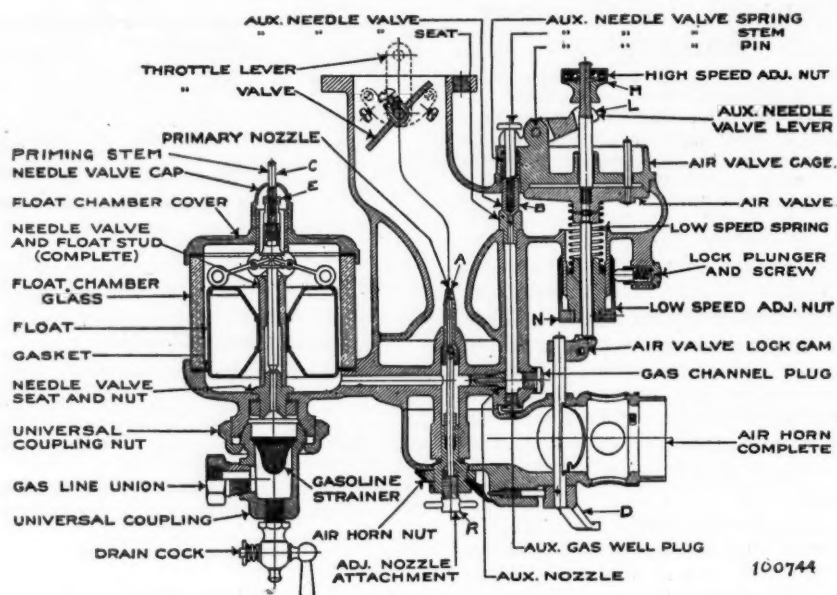


Fig. 1
Stromberg carburetor as installed on early Winton

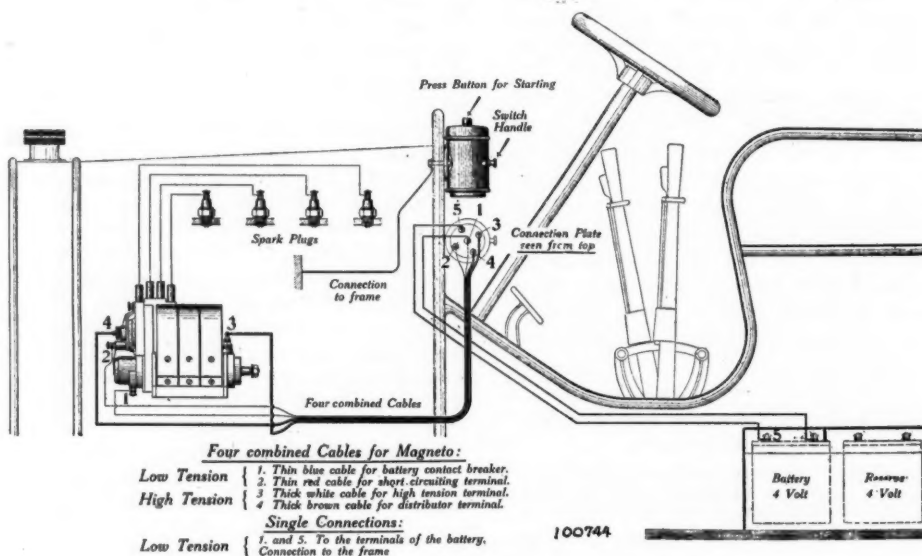


Fig. 2
Wiring of Bosch dual system using cylindrical brass housing coil

level so high that the gasoline floods over the top of the float chamber. When engine starts see that the starting valve (D) is opened. To sufficiently carburete the present-day fuel we would advise the installation of a hot-spot and, if possible, the installation of a later model carburetor. Of the two suggestions we believe that the hot-spot in conjunction with the old carburetor will be adequate.

4—Give instructions for wiring.—Calvin L. Thex, Otter, Mont.

4—An illustration showing the installation of a four-cylinder Bosch dual ignition system using the Winton type coil is shown in Fig. 2. The wiring on your Winton six will follow this same outline, the only difference being in the high tension cables from the magneto distributor. The high tension cables from the magneto distributor should be arranged to accommodate the firing order of 1-5-3-6-2-4.

POINTS ON TWO SPARK MAGNETOS

Q—What are the merits and demerits of the two spark magneto compared with any other?

1—The advantage of a two spark magneto is that two spark plugs in each cylinder can be fired at the same time, thus giving slight increase in power. We do not know of any advantage of this type of ignition but it is usually a little more expensive than a single spark magneto.

2—Should a two spark magneto be timed the same as any other?

2—Yes.

3—Can a two spark magneto be used as a single magneto?

3—Yes, by grounding one of the high tension connections.

4—What manufacturers put out a two spark magneto and what cars are using two spark ignition.—H. W. Read, Pacific Automotive Service, Seattle, Washington.

4—This information will be given by letter.

Simms-Huff Generator on Ford Car

Q—Advise the wiring necessary to use a Simms-Huff generator such as used on a 1915 Maxwell to charge a standard Ford battery. The charging rate need not be greater than 3 or 4 amperes, as the battery is to be used for lighting only. Would like to have the simplest possible method.—A Reader.

In Fig. 1 is shown the simplest way to use the motor generator from a 1915 Maxwell for charging the Ford battery. This generator was designed to use a voltage regulator and without the regulator there will be considerable variation in the charging current at different speeds. As shown in Fig. 1, the heavy starter cable coming from the motor generator is not used. The medium size lead which also comes from the insulated brushes goes to the "G" terminal of the cutout. The frame of the cutout is grounded so as to complete the circuit and allow the cutout points to close.

When the cutout points close, a connection is made from the "G" to "B" terminal, which carries current through the ammeter to the battery. A coil of iron wire is shown connected from the main brush lead from the generator to the

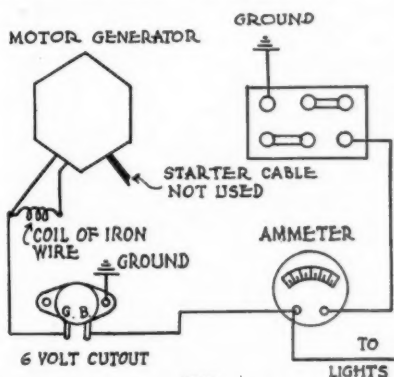


FIG. 1.

SIMMS HUFF GENERATOR FROM 1915 MAXWELL USED ON FORD TO CHARGE BATTERY. #100735

field lead so as to give a limited amount of current to the field. The design of this coil of iron wire will be a matter of experiment, but as a starter, would suggest using about three feet of stove pipe wire. The coil can be changed at any time if not found suitable.

The ammeter is quite essential, either installed on the car or at least for testing purposes when the outfit is first applied, as if too much charging current goes to the battery it will damage it in short time. Six or seven amperes would probably be ample for lighting purposes, and if the generator charges too much it will be necessary to use either a greater length of wire or else wire of smaller diameter. If it is found that with this diagram or layout there is too much variation in the charging current and that it may be too low at low speed and too high at high speed, then it might be advisable to install the lighting switch as shown in Fig. 2. This two-gang switch is made into a sort of rheostat with two iron coils on the back, one coil having twice as much iron wire as the other.

MOTOR GENERATOR

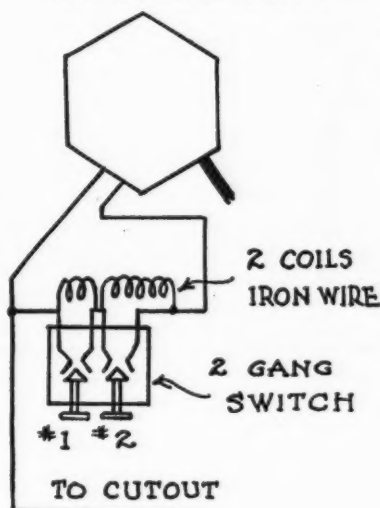


FIG. 2.

IMPROVED CURRENT REGULATION SIMMS HUFF GENERATOR ON FORD

When both buttons of the lighting switch are pushed in both coils will be shorted out, which will give the highest possible charging current at low speed. As the car speeds up, No. 1 button can be pulled out, which will throw a certain amount of resistance into the field circuit. As the car's speed continues to increase No. 1 can be pushed in and No. 2 pulled out, which will throw more resistance in the field circuit, and at extremely high speed both buttons can be pulled out, throwing all of the resistance into the shunt field.

If with both buttons out the charging current is too great at high speed, then the coil should be redesigned for higher resistance by using a greater length of wire in each coil or by using wire of smaller diameter. With this homemade rheostat it would be practically necessary to use an ammeter so as to judge of the charging current at different speeds.

DERANGEMENT ON SUCTION SIDE OF PUMP RESPONSIBLE FOR LACK OF PRESSURE

Q—We are having trouble with the oil pump on a 1917 Studebaker 6. The original pump did not pump, so put in new gears, which caused it to pump for a short while but only about half enough, and so secured a new pump after the old one again failed, but still the new one does not pump. We cleaned the pipe leading from the sump to the pump and the oil tube that feeds the bearings. We have also looked for air leaks but find none, so would like to know what to do next to make it pump and not lose its prime as it does on the road after running about two or three blocks.—The Routt County Garage, Oak Creek, Colo.

1—Granting that you have installed a new pump, or even if the pump were old but not excessively worn, the only possible cause of such trouble would be an air leak or air lock on the inlet or suction side of the pump. We would again suggest that you again check carefully the suction pipe line for air leaks, also for sharp bends which will cause an air

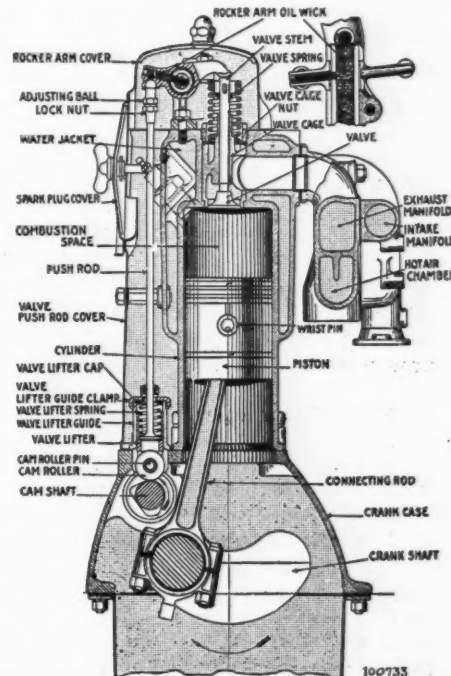
lock, which produces exactly the same effect as an air leak. If you wish to put the pump through a process of elimination, we would advise that you connect the inlet side of the pump to a straight piece of pipe which has been introduced into a vessel of oil. By rotating the pump by some outside method you can determine whether it is the piping or the pump proper which is the cause of the trouble. Air locks are very peculiar in their action and even a small dent in the suction side of a gear pump would be sufficient sometimes to cause a very destructive air lock.

REMOVING BUICK VALVE CAGES

Q—Where can we get a Buick valve cage assembly remover?—Otto H. Weiss, Garage, Hamilton, Ohio.

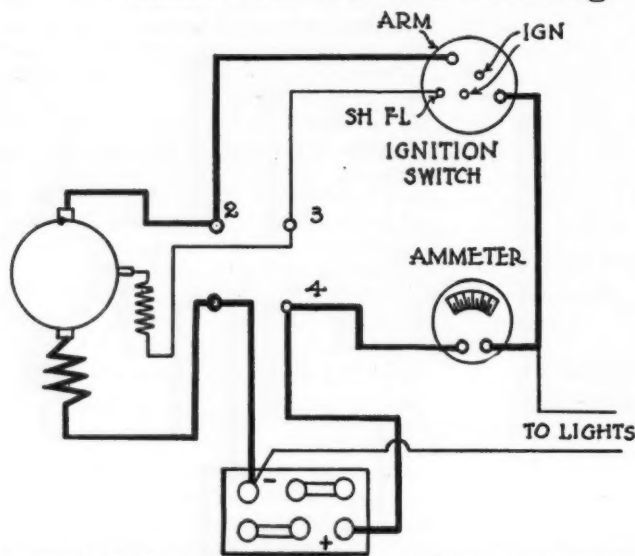
As far as we know there is no regulation tool supplied or made for removing Buick valve cages. In getting them out the valve spring is first compressed so that the push rod can be removed from the socket in the rocker arm and pushed to one side. The rocker ring will then swing back to give enough clearance so that the valve and cage can be removed.

The first step in the removal is to back off the valve cage nut, which can be started with the special Buick wrench furnished. If it is then found that the cage is stuck, due to carbon, it can be loosened by tapping the valve stem with a mallet or fiber hammer. This will drive the valve stem down and as it rebounds it will tend to loosen the cage. If this does not work, a crowbar can be made up with a claw at one end similar to the claw on a tack puller, only bigger. This claw will go in between the turns of the spring and by putting a block in under the crowbar sufficient leverage can be obtained to pull the valve cage out. Great care should be exercised during this operation to prevent bending the valve stem.



Section through Buick six engine, showing valve cage anchorage

Pointers on Trouble Shooting



WIRING DIAGRAM DYNETO MOTOR-GENERATOR, MODELS A & B
USED ON FORD CARS

Q—Give us a few pointers on trouble shooting on the 12-volt Dyneto electrical system used on a few Ford cars of early model.
—Wm. Dowling, Covington, Ky.

A wiring diagram of the Dyneto motor generator in question, together with battery, ammeter and ignition switch, is shown above. This type of motor generator did not use a cut-out, but instead, the operation of the ignition switch served to connect up the shunt field of the machine and also connect the machine to the battery. It will be seen from the diagram

that negative battery is already connected through the series field of the machine to one of the main brushes.

When the ignition switch is turned on another contact in the switch connects the top brush through the switch to the ammeter so that discharge current will go through the meter. Then when the engine starts, the machine will start to act as a generator and will send current the other way through the meter as charging current to the battery. The operation of the ignition switch which connects the two large terminals also connects the number 3 end of the shunt field to the heavy cable which comes from number 2.

In trouble shooting on this type of electrical system it would be well first to try the outfit as a starter as, if it will not start the engine, it is quite likely that the battery is low or that the brushes make poor contact with the commutator. It is also possible that the battery terminals are corroded, which would be noticed by the lights going out when the ignition switch is turned on. If the starting feature is in good condition but the machine will not generate, it is possible that the third brush is not making good contact with the commutator or that the field connection inside of the ignition switch is not made.

To check this condition it would be possible to temporarily disconnect the wire on the number 3 terminal and then flash it to this terminal when the ignition switch is turned on and the starter is cranking the engine. If no spark occurs the circuit is open. A wire can now be temporarily connected from the armature to the shunt field terminal on back of the ignition switch to see if this corrects the trouble. If it does so, the switch is at fault, otherwise the open circuit is doubtless in the field winding of the motor generator. It should be remembered in working on a system of this kind that an ordinary ammeter will not be satisfactory, as it will burn out in carrying the starter current. Special meters, however, are obtainable which can be used without harm for starter current and will also register the generating current.

Novel Way of Using Resistances for Battery Charging

Q—We have a call for some battery charging resistance units for 110 volts d. c., but it seems that they are hard to locate. Advise us where these may be obtained.

1—This information will be given by letter.

We are enclosing a sketch showing a method of charging batteries from 110 volts d. c. by the use of 6.4 ohm resistance units designed for use with 32-volt current. The figures given for current that flow do not take into account the resistance of batteries, wires and clips, but this would act to give us a margin of safety so that the actual current would be less than the figures we have shown.—Service Garage, Amelia, Va.

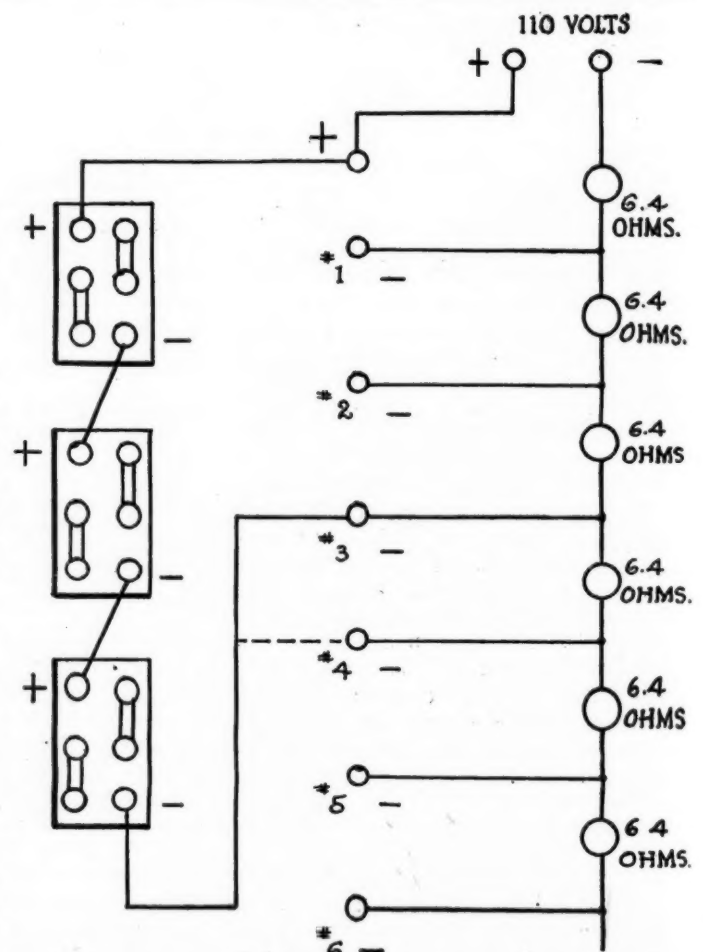
2—The sketch submitted by the Amelia Garage has been reproduced and is shown in the cut below. As indicated in this diagram, the intention is to have a connection from the positive side of the 110-volt circuit always go to the positive end of the string of batteries that are on charge. From the negative side connection goes to six of the resistance units mentioned, which are connected in series. Taps or leads from between the various resistances go to terminals or clips which can be used at various times according to the number of batteries on charge and the rate of charge desired.

In connection with the sketch submitted, the following figures were also submitted:

	Amps.
A 9 6-volt batteries at Term. No. 1	17.2
B 6 6-volt batteries at Term. No. 2	8.6
C 3 6-volt batteries at Term. No. 3	5.7
D 3 6-volt batteries at Term. No. 4	4.3
E 2 6-volt batteries at Term. No. 5	3.4
F 1 6-volt battery at Term. No. 6	2.9

These figures were obtained by dividing 110 volts by the resistance being used, but no allowance was made for the counter-voltage of the batteries. Thus the value of 17.2 amperes was obtained by dividing 110 volts by 6.4 ohms, while in test "B," where two resistances were used, 110 volts were divided by 12.8 ohms.

Neglecting to consider the battery voltage has given cur-



READER'S SUGGESTION ON CHARGING BATTERIES
FROM 110 VOLTS D.C.

rent values which are much too high in most cases, the correct way to figure the current being to first subtract the battery voltage from 110 volts and then divide this result by the resistance in question.

In case "A," therefore, we would have a battery voltage of 9 times 6, or 54 volts. Subtracting 54 from 110 we have 56 volts, and dividing 56 by 6.4 we get 8.7 amperes as the actual current instead of the value 17.2. NOTE that we have not considered the resistance of the wires or clips, nor have we figured the internal resistance of the battery, which is very slight, so that in actual service the current might be slightly lower, perhaps 8.5 instead of 8.7. It is, however, just as necessary to figure the back E. M. F. or voltage of the battery as it is to consider the main voltage, especially when there are many batteries being charged. When only one battery is being considered it does not make so much difference, as in one case 110 volts would be considered while, to be correct, 104 volts should be used in making the calculations.

The following table will give the correct values:

		Amps.
A	9 6-volt batteries at Term. No. 1.....	8.7
B	6 6-volt batteries at Term. No. 2.....	5.8
C	3 6-volt batteries at Term. No. 3.....	4.8
D	3 6-volt batteries at Term. No. 4.....	3.4
E	2 6-volt batteries at Term. No. 5.....	3.0
F	1 6-volt battery at Term. No. 6.....	2.7

In the above figures the counter-voltage of each battery was considered to be 6 volts. This value increases as the battery becomes charged, coming up at the end to 7.5. As "D" is supposed to be a finish charge for these three batteries, the value of 7.5 was used instead of 6 volts for this case only.

In calculating resistances for battery charging there is another point to be considered after the probable current has been determined, and that is whether the resistances are designed for the flow required or whether they will burn out. If these 6.4 ohm resistances will carry 10 amperes without excessive heating, they will be O. K. for the job, but if good for 5 amperes only, they would overheat in case "A," where 8.7 amperes would be flowing.

Charging Batteries From 110 Volts D. C. Is It Efficient?

Q—We have a 6-volt storage battery that we wish to charge from the shop circuit which is 110 volts D. C. Kindly furnish us with a most efficient circuit for same including in the diagram a Cadillac-Delco circuit-breaker relay, a charge and discharge ammeter and a voltmeter. Will it be possible to use a rheostat efficiently for this service?—A. E. Ferrar, New York City, N. Y.

In Fig. 1 is shown a diagram suitable for charging one 6-volt battery by using a lamp bank to serve as a resistance. The diagram also shows an ammeter and voltmeter correctly connected. The Cadillac-Delco circuit breaker relay is not suitable for this purpose, as it is designed to operate on 6 volts and we are charging with 110 volts. A circuit breaker is also unnecessary except in the case of a small town lighting system where the power is likely to go off at most any time with a large string of batteries on charge. Under these circumstances a reverse current relay is desirable so that in case the power goes off the string of batteries in your shop will not be used for operating your neighbors lights.

In the diagram shown in Fig. 1 the ammeter and voltmeter could be dispensed with as the hydrometer is usually used to determine when the battery is fully charged. If 16 c. p. carbon bulbs are used in the sockets shown in the lamp bank then you will get approximately $\frac{1}{2}$ ampere for each bulb that is used, so that as shown the circuit would be carrying a current of about two amperes. Five or six amperes would be satisfactory for charging the battery and this would require 10 or 12 lamps instead of the four that are shown.

In connecting the battery into the circuit it is very essential to get the positive connected to the positive side of the line and the negative battery to the negative side. One easy way to determine this is to take the two wires that you intend to connect to the battery and dip them into a glass filled with salt water or water containing a slight amount of acid. The negative wire will bubble more than the positive. The same test

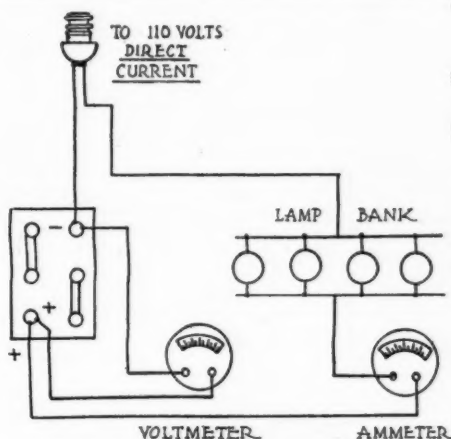


Fig. 1

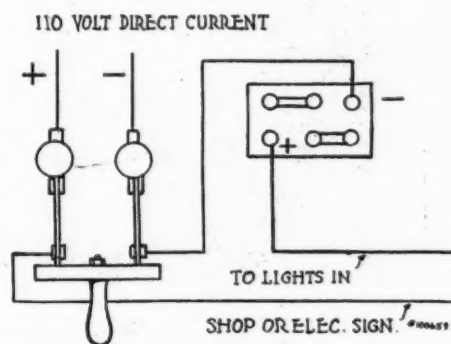


Fig. 2

can be made on the battery to see which terminal is negative in case the markings are not clear. Then connect negative to negative and positive to positive.

Another rough check on the correctness of the connections is to connect the battery in any old way and see if the lamps are brighter or dimmer than normal. One connection of the battery will make the lamps light up brighter and the other connection will make them dimmer. The dim connection is the correct one for it shows that the battery voltage opposes that of the line. The difference at the lamps will be due to the fact that they operate on either 110 plus 6 volts which is the wrong connection or on 110 minus 6 volts which is the right connection.

In regard to furnishing a diagram giving an efficient method of charging would

say that this is impossible with this method as for every 110 units of power that you pay for 6 are used in the battery and 104 used in the lights. The inefficiency is evident from this statement. The use of a rheostat has no advantage as you merely throw away the current in heat instead of in light. One possible method of charging a battery however is available in which the expense is reduced to practically nothing.

This method is shown in Fig. 2 and depends on using the current which would be used anyway in the shop and letting it go through the battery. We are not really getting something for nothing as the lights in the shop will be slightly dimmer as they will operate on 104 instead of 110 volts, but the difference is usually not enough to be a serious matter. In one electrical service station this method has been used and a battery has been connected in series with the line supplying current to an electric sign which operated all night. Thus the battery was charged without throwing away a great deal of current for the current was also being used in the electric sign.

AUTOMOBILE LICENSE EFFECTIVE ONLY IN STATE WHERE ISSUED

Q—I bought a Ford car in Muncie, Indiana, on August 1, 1922, bought license in Indiana which was Indiana license. I want to know if the Indiana license is good in Ohio until the first of the year or not? Thanking you for any information you may give me.—H. H. Morgan, Sabina, O.

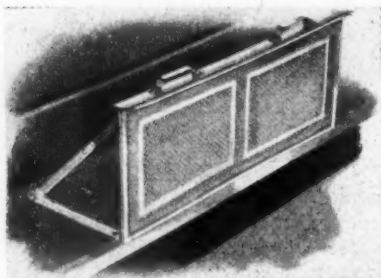
No automobile license issued by the state of Indiana is good in the state of Ohio, except on transient cars. An owner living in one state is permitted, in another state, to drive his car therein for a limited period only, and then only as a visitor in the state. No resident of one state can use therein a license issued by another state since the license rights granted are good only within the state of issue. You should make application and secure permit in the state of your present residence. If the Indiana license is good until the end of the year you should secure a rebate on the license charges covering the balance of the year during which such license is not used.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

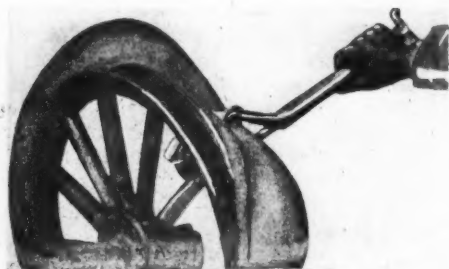
KAUFMAN'S CARRY-ALL AUTO STEP

This new aluminum step, attached to the running board of a car, can be converted into a luggage carrier by releasing a knob and raising, to the position shown in the illustration. It is made by the Eclipse Timer Mfg. Co., in two styles, which sell for \$10.00 and \$15.00.



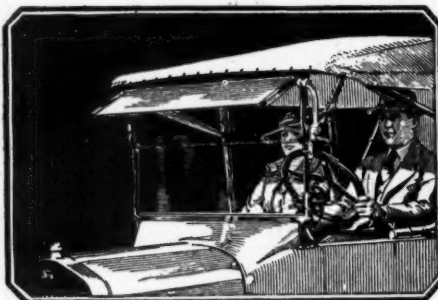
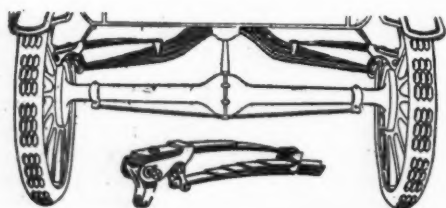
B. B. RIM TOOL

The B. B. Rim Tool is a device for removing tires from rims. The cut shows it in operation. Bjornlie Mfg. Co., Watertown, S. D. Price \$5.



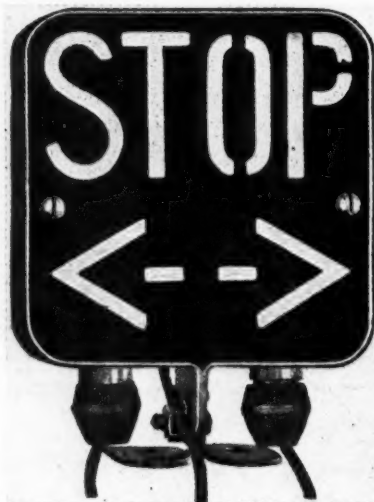
HILLIARD ANTI-SHOCK SPRINGS FOR FORDS

The Hilliard Anti-shock Springs are attached to the Ford chassis without interfering with the regular spring work on the Ford. Front and rear springs are made with a special size for trucks. Fidelity Mfg. Co., Kansas City, Mo.



"SUNBEAM JUNIOR" VISOR FOR FORDS

To supply the demand for a visor for Ford cars, Thoma & Sons, Inc., Fairfield, Iowa, has produced the Sunbeam Junior. It is made of 1/4 in. ribbed glass in either green or amber color. Price, \$16.00.



THE BOSK AUTO SIGNAL

This signal is designed with two similar faces so that the signal is visible both front and rear. The stop and direction figures are in dark red, said to be easily distinguishable for a block and in the daytime as well as at night. A switch, operating the directional signals is placed in front of the driver. The stop signal is operated by the brake. This signal is mounted on the mudguard of the left rear wheel. It is made entirely of metal except for a piece of heavy celluloid, back of the stencilled steel faces. It measures 4 1/2 in. high, 4 1/2 in. wide and 2 in. thick. The Bosk Auto Signal Co., Stamford, Conn. Price, \$7.50.

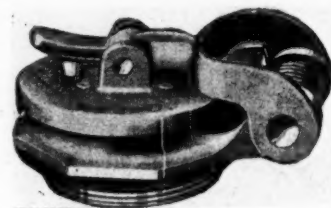
ATLAS RADIATOR

The Atlas Radiator for Ford Cars is described as "The Radiator with a Backbone." The backbone consists of a heavy steel bar, formed integral with the bracket supports, to add strength to the frame and prevent spread and strain on the walls or core of the radiator. The honeycomb, expanding brass core has an unusually large water volume and thin stream. Steidle Mfg. Co., Cincinnati, Ohio.



HELMET PARKING LAMP

The Helmet Parking Lamp sells for \$2.50, without switch or bulb. It is made of virgin aluminum and the lenses are secured by spinning metal over edge of glasses. It is of one-piece body construction and has three-way lighting focus, making the car visible from front, rear and side. It weighs four oz. Williamson Mfg. Co., Baltimore, Md.



"NEACO" SAFETY GAS TANK CAP

The "Neaco" Safety Gas Tank Cap, produced by the Non-Explosive Appliance Co., Fort Wayne, Ind., is designed to be screwed permanently into the gas tank. In filling, the lid is lifted and the nozzle or funnel inserted, when withdrawn the lid, operated by a spring, closes automatically. Special gaskets prevent leakage or splashing in rough driving. It is claimed that this cap eliminates danger of explosions caused by expanding vapor in the tank and that, under such conditions, the lid lifts allowing the gas to escape. The cap comes in two sizes at \$2.50 and \$3.00.

Up-to-Date Plant Will Service Buick and Oakland in New York

Six-Story Building Now Under Construction to House Two Distinct Organizations

A VERY fine new building is under construction by General Motors in New York to house the service departments of Buick and Oakland. While under one roof, it will hold two separate and distinct organizations, each serving its own customers in its own way.

The building is located on the east side of Eleventh avenue, occupying the block between Fifty-Fifth and Fifty-Sixth streets, with total dimensions of 200 ft. by 100 ft.; it will be of reinforced concrete, six stories high, and the total floor space, for the present, will be 123,000 sq. ft. Provision is made for additions which will bring the total space up to 146,000 sq. ft.

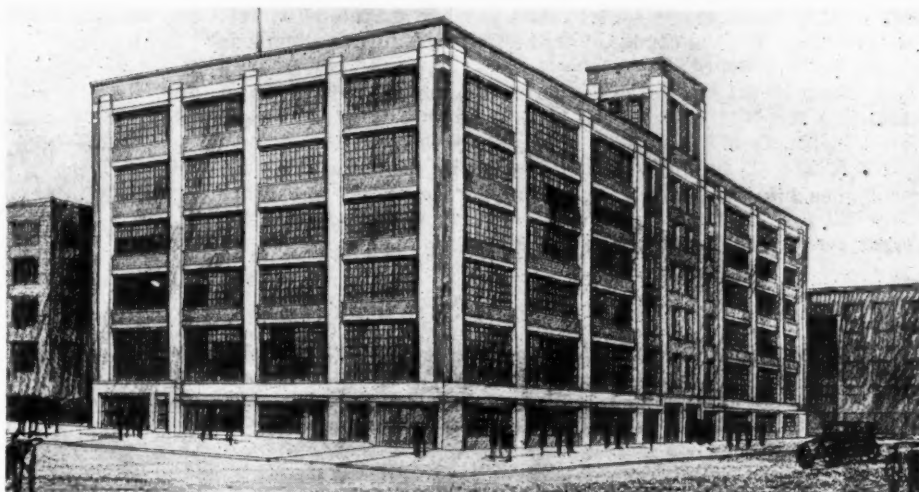
The first two floors are divided through the center, Buick having half and Oakland the other half. The first in both cases is a mammoth reception and clearing house floor where service is estimated and minor adjustments made, while the second in both cases is used principally for parts, storage and sales. Above the second floor the floors are retained entirely for the respective cars, Buick occupying the third and fourth and Oakland the fifth and sixth.

The feature of the storage floors is a broad, open central bay for general service and the small special shops surrounding it along the outside window spaces. The open bays are literally covered by overhead tracks so that heavy parts may be moved to or from the shops with ease.

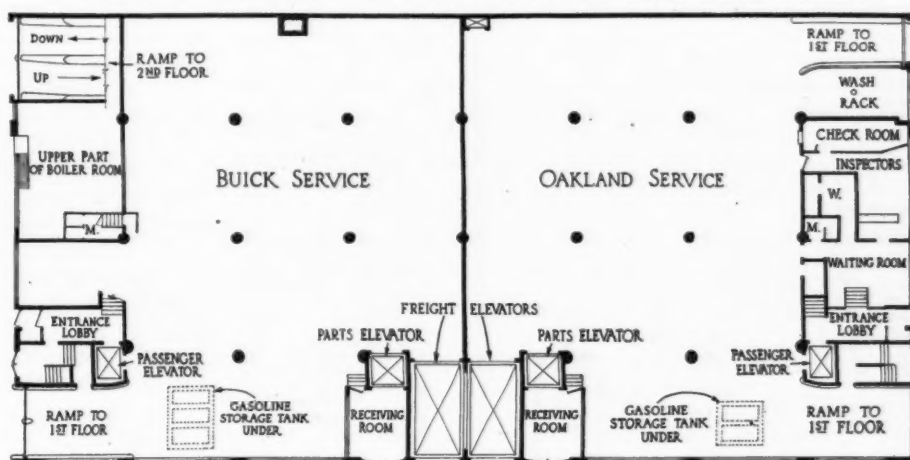
Each organization has a freight elevator, passenger elevator and parts elevator, the parts elevator opening at the bottom into rooms on the outside wall, into which a truck may be backed. To make up for the space taken by the boiler room and coal bin, which are on the Buick side, a mezzanine floor has been constructed to hold the waiting rooms.

Provision has been made for another floor; no doubt, the organization that grows the most will get this floor, or perhaps it will be the one which needs the most repairing.

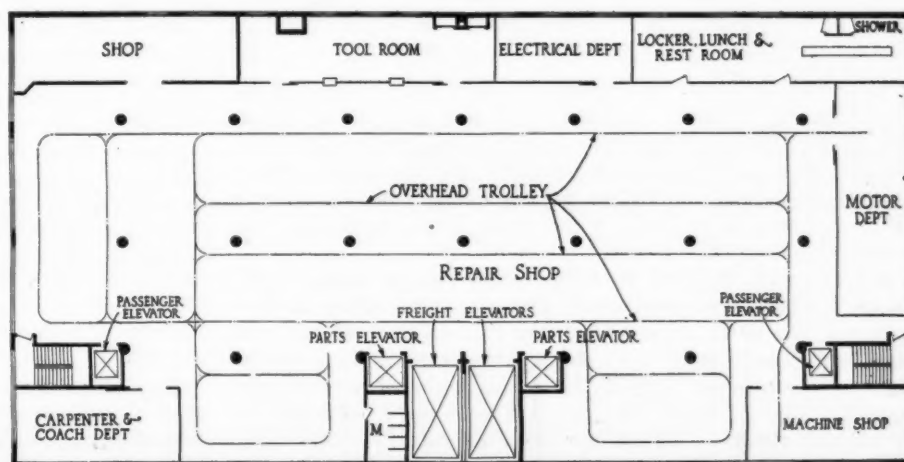
Another feature which the designers of this building are proud of is the location of the elevators in front-center, so that there is easy access from the street to the upper floors without entering the main reception floor. On the Buick side the second floor is reached by ramps, the main floor being below the street grade.



Architect's drawing of the new Buick-Oakland service building as it will appear when completed. An entrance in the front center leads directly to the car elevators



FIRST FLOOR PLAN



THIRD & FIFTH FLOOR PLANS

What Comes Out of a Barrel of Crude Oil

YOU drive up to a filling station and say: "Put in five gallons of gas." You pay for it and drive off.

It is all so much a matter of course that you never stop to think of what has been done by somebody to make it so easy for you.

Every time you use five gallons of gas in your car somebody has to pump a half barrel of crude oil out of the ground.

Examination of recent figures showing over a half a billion barrels of crude oil produced for use in America last year and only 123,000,000 barrels of gasoline made from it develops the fact that it takes nearly four barrels of oil to make one barrel of gasoline. Yet the crude oil of the United States and Mexico is produced primarily for gasoline.

A digest of oil figures compiled by the American Petroleum Institute for 1921 shows that 405,000,000 barrels of oil were used in the form of petroleum products other than gasoline.

There are 42 gallons of oil in a barrel. Of these 25.6 per cent goes into gasoline; 9.7 per cent kerosene; 47.9 per cent fuel and gas oil; 4.3, lubricating oil; 2.4 wax, coke and asphalt; 6 per cent miscellaneous and 4.1 per cent loss.

Tests of Aluminum Solders

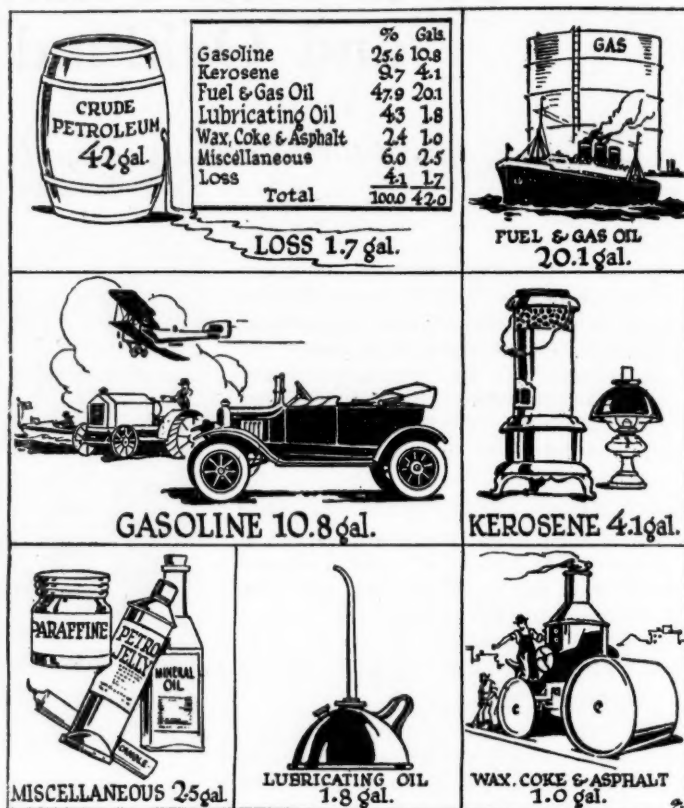
ONE of the handicaps to the more extensive use of aluminum in the industries is the difficulty with which it can be soldered. This is due to the fact that a freshly cleaned surface of aluminum in contact with the atmosphere oxidizes immediately, and no flux seems to be known which will dissolve this oxide and at the same time protect the metallic surface beneath it.

A series of tests on soldered joints has been made recently at McCook Field, Dayton, Ohio, and the results are published in Air Service Information Circular No. 298. Fifteen solders were tested, of which fourteen were alloyed by the metallurgical branch of the Air Service and the remaining one was the commercial preparation known as Allen's soldering flux. Compositions of all fifteen alloys are given in the table below. The only composition which was actually determined chemically was that of No. 15, Allen's soldering flux, the other compositions being known from the proportions of the metals alloyed.

Solder No.	Sn.	Zn.	Al.	Cu.	Mg.	Pb.	Fe.
1.....	60.00	40.0	.....	.....	.....	.....	.....
2.....	58.20	38.8	3	.....	.....	.....	.....
3.....	57.00	38.0	5	.....	.....	.....	.....
4.....	54.00	36.0	10	.....	.....	.....	.....
5.....	57.40	38.6	3	1	.....	.....	.....
6.....	56.40	37.6	3	3	.....	.....	.....
7.....	56.40	37.6	5	1	.....	.....	.....
8.....	55.20	36.8	5	3	.....	.....	.....
9.....	52.40	36.6	10	1	.....	.....	.....
10.....	52.20	34.8	10	3	.....	.....	.....
11.....	59.40	39.6	.....	1	.....	.....	.....
12.....	58.20	38.8	.....	3	.....	.....	.....
13.....	59.10	39.4	.....	1	0.5	.....	.....
14.....	57.90	38.6	.....	3	.5	.....	.....
15.....	47.86	52.2	Trace	Nil	Nil	Nil	Trace

Soldering was done by means of a small oxy-acetylene torch, the flame being kept neutral as nearly as possible. Specimens for soldering were prepared from aluminum sheet $\frac{1}{8}$ in. thick, a central member $4\frac{15}{16}$ by $1\frac{1}{8}$ in. being soldered to two outer members or lap caps 1 in. square. The soldering was accomplished in the following manner:

A spot $\frac{1}{4}$ in. deep on the ends of the central member and on each of the caps was tinned with the same solder as was used for the joint. The solder was rubbed in with the end of a hack saw blade. On each of the superficially coated ends of the central member a small lump of solder was melted. The lap caps were then successively soldered on by placing them on top of the layer of solder on the ends of the control member and by applying the heat to the uncoated top of the caps. A slight pressure was maintained



on the caps while the solder was melted down. The projecting ends of the caps were supported to keep the caps horizontal. The assembled specimens were then turned over so that they were supported by the caps. Heat was then reapplied to level the specimens and to finish up the joints. Sufficient time was allowed after finishing one end of the specimen so that the joint there would not become hot enough to melt when the other end was being bonded.

The excess solder was led off, and the edges of support and load in shear were filed parallel. The ends of each assembled specimen were cut off and comprised the specimens for actual shear testing. The shear specimens thus consisted of two lapped pieces of aluminum sheet, each 1 in. long, and possessed a soldered area 1 in. wide by approximately 4 in. deep.

The following conclusions are drawn from the results:

Additions of aluminum to solders of tin-zinc base tend to increase the strength of the joint as immediately tested and after aging. The strongest solder of the group is the 10 per cent alloy, but it is of high melting point and sluggish in flow.

The effect of additions of copper to the aluminum-tin-zinc alloys is appreciable only in the 3 per cent copper alloys. The best solder of the group from the standpoint of both strength and fusibility is the 3 per cent copper and 3 per cent aluminum alloy.

The addition of 3 per cent of copper to the tin-zinc base produces the more favorable solder in this ternary group. It is as good as the solder containing 3 per cent copper and 3 per cent aluminum and is much superior to the 3 per cent aluminum alloy. The fusibility of this alloy is quite good and its strength is higher than the run of commercial preparations.

Magnesium additions to cupriforous solders produce negative results.

Aged soldering joints tend in general to be of lower strength than joints tested immediately after soldering.

It is probable that cupriforous solders are higher in strength after aging than those of the same approximate analysis which do not contain copper.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Cleveland	Enclosed Car Exhibit—Cleveland Automobile Manufacturers & Dealers' Association	Sept. 18-23
Memphis	Memphis Automobile Dealers' Assn.	Sept. 23-30
New York	Enclosed Car Show—Automobile Merchants' Association	Sept. 23-30
Detroit	Enclosed Car Salon at General Motors Bldg., Detroit Automobile Dealers' Assn.	Oct. 17-21
Wash'gton, City of	Enclosed Car Salon	Oct. 21-28
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
Cincinnati, O.	Second Annual Automobile and Radio Exposition	Nov. 23-29
New York	National Automobile Body Builders' Show	Jan. 8-13
New York	Annual Show	Jan. 6-13
Cleveland, O.	Annual Winter Show, Cleveland Automobile Mfr's. and Dealers' Assn.	Jan. 20-27
Chicago	Annual Show at Coliseum	Jan. 27-Feb. 3
Minneapolis	Annual Show	Feb. 3-10

CONVENTIONS

Toledo, O.	Annual Convention, Ohio Automobile Trades Assn.	Sept. 6-8
Santa Barbara	Annual Convention, California Automotive Trades Assn.	October
Chicago	Nat'l. Association of Farm Equipment Manufacturers	Oct. 18-20
Chicago	Annual Meeting Automotive Equipment Association	Nov. 13-18

FOREIGN SHOWS

Berlin	Kaiserdamm Hall	Sept. 25-Oct. 3
Rio de Janeiro	Automotive Exhibition	Sept., 1922
London	International Commercial Vehicle Exhibition	Oct. 12-13
Paris, France	Automobile Show	Oct. 4-15
London	Annual Show	Nov. 3-11

RACES

Fresno, Calif.		Sept. 30
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11
Los Angeles, Calif.		Nov. 30
San Diego, Calif.		January

Now They Have a Bowling Team

By J. V. M.

A Chicago dealer who was having some trouble about the men in the shop, found that the trouble was because the men liked to amble out of evenings and break into bowling matches at a nearby pool room. They were always sleepy-eyed in the morning and couldn't do their work, so the dealer thought it over and finally pasted up a sign telling that he was going to organize a bowling team and that he wanted his men to join him in the sport. Now he goes out with them and they play together and chat and the men are not sleepy-eyed in the morning any more, because the boss sees to it that they are home in good time and get their sleep. And if you want to meet an untimely end, say to one of those men that their boss is not a regular guy.

Rubber Tested as a Road Surfacing Material

Experiments are being carried out by the Colombo municipality in the use of rubber as a road surface dressing, says Consul Vance, Colombo, in a recent report to the Department of Commerce. The dressing, which is the invention of a Ceylon rubber planter, is now being used on a portion of Darley road, which is one of the most used thoroughfares in Colombo. This solution was first tried on a road of the Deviturai rubber estate, where it has been in use for the past thirteen months. A short stretch was later laid in the municipality of Galle. The present test, however, is the hardest to which the new solution has been put.

The solution is made from pure bark and scrap rubber. The experiments so far show that this solution is easier to handle than tar. It is a secret formula and the inventor is still working toward its perfection.

The idea of using rubber for roads has been almost exclusively confined in the past to rubber blocks, the cost being very high. The cost of the liquid rubber road dressing is 50 to 75 per cent more than that of tar, but it is found that a tar dressing in Ceylon must be renewed every three or four months, while rubber dressing is expected to last from eight

to nine months or longer. It is anticipated that a slight difference in the cost of material, in favor of the rubber dressing, will be found, that labor cost will be reduced 50 per cent at least, and that a better road surface will be procured.



Beware of the Dog!

This portrays only too truly the fate that is often that of the dealer who is so full of "free service" talk when the sale is made. Be careful to make plain just what items your six months' service covers.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive			
				Front	Rear					Front	Rear					Front	Rear			
Acason.....	3-1	\$1650a	3 1/2 x 5 1/2	34x5n	34x5n	W	Corbitt.....B-22	2 1/2	\$3000	4 1/2 x 5 1/2	36x4	36x7	W	Gary.....J	2 1/2	\$2650	4 1/2 x 5 1/2	36x4	36x8	W
Acason.....R3	1 1/2	1950	3 1/2 x 5 1/2	36x3 1/2	36x6	W	Corbitt.....R-22	3	3200	4 1/2 x 5 1/2	36x4	36x8	W	Gary.....K	3 1/2	3650	4 1/2 x 5 1/2	36x5	40x5d	W
Acason.....H	2 1/2	2750	4 1/2 x 5 1/2	36x4k	36x8k	W	Corbitt.....A-22	3 1/4	3800	4 1/2 x 5 1/2	36x5	36x10	W	Gary.....M	5	4100	5 x 6 1/2	36x6	40x6d	W
Acason.....L	3 1/2	3150	4 1/2 x 5 1/2	36x5k	36x10k	W	Corbitt.....AA-22	5	4500	4 1/2 x 6	36x6	40x6d	W	Gersix.....M	1 1/2	3100	4 1/2 x 5 1/2	36x3 1/2	36x7	W
Acason.....M	5	4350	5 x 6 1/2	36x6	40x12	W							Gersix.....K	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x8	W	
Ace.....C	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2	34x5k	W							Gersix.....K	3 1/2	4500	4 1/2 x 6	36x5	40x12	W	
Ace.....A	2 1/2	2735	4 1/2 x 5 1/2	36x4k	36x7	W							Graham Bros.....	1	1265	3 1/2 x 4 1/2	33x4 1/2	34x5n	B	
Acme.....29	1	.....	3 1/2 x 5 1/2	35x5n	35x5n	W	Day-Elder.....AS	1	1600	3 1/2 x 5	35x5n	35x5n	W	Graham Bros.....	1 1/2	1325	3 1/2 x 4 1/2	33x4 1/2	36x5n	B
Acme.....39	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Day-Elder.....B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	Gramm-Pion.....10	1	1245	3 1/2 x 5	33x5n	33x5n	B
Acme.....49	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x7k	W	Day-Elder.....D	2	2400	4 1/2 x 5 1/2	36x4	36x7	W	Gramm-Pion.....12	1 1/2	1750a	3 1/2 x 5	36x3 1/2	36x5k	I
Acme.....63	3	.....	4 1/2 x 5 1/2	36x4	36x7k	W	Day-Elder.....E	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x7	W	Gramm-Pion.....16	1 1/2	2250a	3 1/2 x 5	36x3 1/2	36x5	W
Acme.....99	4 1/2	.....	4 1/2 x 5 1/2	36x5	40x10	W	Day-Elder.....F	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5d	W	Gramm-Pion.....20	2	2475a	4 1/2 x 5 1/2	36x4k	36x7k	W
Acme.....125	6 1/2	.....	4 1/2 x 6	36x6	40x12	W	Day-Elder.....G	5	4250	4 1/2 x 6	36x5k	40x6dk	W	Gramm-Pion.....30	3	3300a	4 1/2 x 5 1/2	36x4k	36x4dk	W
America.....25	2 1/2	3350	1 x 6	16x4k	36x4dk	W	Dearborn.....E	1	1600	3 1/2 x 5 1/2	35x5n	35x5n	W	Gramm-Pion.....75P	3 1/2	4225a	4 1/2 x 5 1/2	36x6n	42x9n	W
America.....40	4	4275	1 x 6	16x6	36x5dk	W	Dearborn.....FX	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Gramm-Pion.....40	4	3850a	4 1/2 x 5 1/2	36x5	36x5dk	W
Armleder.....29	1	.....	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Dearborn.....F	1 1/2	2130	3 1/2 x 5 1/2	34x4	34x5	W	Gramm-Pion.....50	5-6	4450a	4 1/2 x 6	36x6	40x6dk	W
Armleder.....21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Dearborn.....43	2	2590	3 1/2 x 5 1/2	34x4 1/2	34x7	W							
Armleder.....43-B	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Defiance.....D	1 1/2	1695a	3 1/2 x 5	35x5n	35x5n	B	Hall.....1 1/2	1 1/2	3100	3 1/2 x 5	34x5n	38x7n	W
Armleder.....43-C	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Defiance.....G	1 1/2	2275a	3 1/2 x 5	35x5n	38x7n	B	Hall.....2 1/2	2 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W
Armleder.....HW-B	2 1/2	.....	4 1/2 x 5 1/2	36x4k	38x7k	W	Defiance.....E	2	2275a	3 1/2 x 5	35x5n	35x5n	B	Hall.....3 1/2	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W
Armleder.....11W-C	2 1/2	.....	4 1/2 x 5 1/2	36x4k	36x7k	W	Denby.....31	1 1/2	1485	3 1/2 x 5	35x5n	35x5n	B	Hall.....5	5	5100	4 1/2 x 5 1/2	36x5	40x6d	W
Armleder.....KW-B	3 1/2	.....	4 1/2 x 6	36x5k	36x5dk	W	Denby.....33	1 1/2	2145	3 1/2 x 5	35x5n	38x7n	B	Hall.....7	7	5100	4 1/2 x 5 1/2	36x5	40x6d	C
Armleder.....KW-C	3 1/2	.....	4 1/2 x 6	36x5k	36x5dk	W	Denby.....31	2	2395	3 1/2 x 5	36x3 1/2	36x6	I	Harvey.....WHA	2	2650	4 1/2 x 5 1/2	34x4	34x7	W
Atlas.....MD	1	1135	3 1/2 x 5	32x4 1/2	32x4 1/2	W	Denby.....37	2 1/2	2795	4 1/2 x 5 1/2	36x4	36x7	I	Harvey.....WFA	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W
Atterbury.....2JR	1 1/2	2175	3 1/2 x 5	34x3 1/2	34x5	W	Denby.....27	4	3895	4 1/2 x 5 1/2	36x5	36x5d	I	Harvey.....WHA	3 1/2	3350	4 1/2 x 6	36x4	36x5d	W
Atterbury.....22C	2 1/2	3375	4 1/2 x 5 1/2	36x4	36x4d	W	Dependable.....A	3 1/2	4295	4 1/2 x 5 1/2	36x6	40x6d	I	Hawkeye.....K	1 1/2	1850	3 1/2 x 5	34x3 1/2	34x5k	I
Atterbury.....22C	2 1/2	3375	4 1/2 x 5 1/2	36x4	36x4d	W	Dependable.....C	2	2350	4 1/2 x 5 1/2	34x5n	36x6n	W	Hawkeye.....M	2	2650	4 1/2 x 5	34x4	34x7	W
Atterbury.....22D	3 1/2	4375	4 1/2 x 5 1/2	36x5	40x5d	W	Dependable.....D	2 1/2	2650	4 1/2 x 5 1/2	34x5	36x6	W	Hawkeye.....N	3 1/2	3700	4 1/2 x 5	36x5k	36x10k	I
Atterbury.....22D	3 1/2	4275	4 1/2 x 5 1/2	36x5	40x5d	W	Dependable.....E	3	2950	4 1/2 x 5 1/2	36x4	36x7	W	Hendrickson.....O	1 1/2	2200	3 1/2 x 5	36x4n	36x5n	W
Atterbury.....8E	5	4975	4 1/2 x 6	36x5	40x6d	W	Diamond T.....O-1	1-1 1/4	1975	3 1/2 x 5 1/2	36x3 1/2	36x4n	W	Hendrickson.....N	2 1/2	2690	4 1/2 x 5 1/2	36x4k	36x7k	W
Atterbury.....8E	5	5125	4 1/2 x 6	36x5	40x6	W	Diamond T.....U	2-2 1/4	2650	4 1/2 x 5 1/2	36x4	36x7	W	Hendrickson.....M	3 1/2	3000	4 1/2 x 5	36x5k	36x5dk	W
Autocar.....21U	1 1/2	1950	3 1/2 x 5 1/2	34x4k	34x5k	D	Diamond T.....3	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x5d	W	Hendrickson.....K	5	4000	5 x 6 1/2	36x6	40x6	W
Autocar.....21UG	1 1/2	2050	3 1/2 x 5 1/2	34x4k	34x5k	D	Diamond T.....EL	5	4325	4 1/2 x 5 1/2	36x6	40x6d	W	Huffman.....C	1 1/2	1695	3 1/2 x 5	36x3 1/2	36x6	I
Autocar.....27H	2	2950	4 1/2 x 5 1/2	34x5	36x7	D	Diamond T.....S	5	4500	4 1/2 x 5 1/2	36x6	40x6d	W	Huffman.....D	2-3	2895	4 1/2 x 5 1/2	36x4	36x7	W
Autocar.....27K2	2	3375	4 1/2 x 5 1/2	34x5	36x7k	D	Doane.....2 1/2	4100b	4 1/2 x 5 1/2	36x5	36x7	C	Hurlburt.....A-A	1-1 1/2	1950	3 1/2 x 5	34x5n	34x5n	W	
Autocar.....26V	5	3950	4 1/2 x 5 1/2	34x6	36x12	D	Doane.....3 1/2	5100b	4 1/2 x 5 1/2	36x5	36x5d	C	Hurlburt.....B-B	2-2 1/2	2800	4 1/2 x 5 1/2	36x5	36x5d	W	
Available.....H1 1/2	1 1/2	2475	4 1/2 x 5	36x3 1/2	36x5k	W	Doane.....6	6000b	5 x 6 1/2	36x6	40x6d	W	Hurlburt.....C-C	3-4 1/2	3475	4 1/2 x 5 1/2	36x5	36x5d	W	
Available.....H2 1/2	2 1/2	2775	4 1/2 x 5	36x3 1/2	36x6k	W	Dodge Brothers.....	730	3 1/2 x 4 1/2	32x4n	32x4n	B	Hurlburt.....D-D	4-4 1/2	4150	4 1/2 x 5 1/2	36x6	36x6d	W	
Available.....H3 1/2	3 1/2	3160	4 1/2 x 5	36x4k	36x8k	W	Dorris.....K-7	3 1/2	3400	4 1/2 x 5 1/2	36x5	36x10	W	Hurlburt.....E-E	6-6 1/2	4850	4 1/2 x 6	36x6	40x6d	W
Available.....H5	5	5375	5 x 6	36x6	40x12	W	Dorris.....K-7	3 1/2	4400	4 1/2 x 5 1/2	36x5	36x10	W							
Available.....H5	5	5375	5 x 6	36x6	40x12	W	Dorris.....K-7	3 1/2	4400	4 1/2 x 5 1/2	36x5	36x10	W							
*Avery.....1	1	.....	3 x 4 1/2	31x5n	31x5n	I	Duty.....22	2	1590	3 1/2 x 5	34x3 1/2	34x5	I							
Beck.....A J.	1 1/2	1235a	3 1/2 x 5	34x4 1/2	34x4 1/2	I	Eagle.....101	1 1/2	1875	3 1/2 x 5 1/2	34x5	34x5	I	Indep't (Iowa) B	1	1665	3 1/2 x 5	34x3 1/2	34x4	I
Beck.....B-3	1 1/2	1725	3 1/2 x 5	34x5	36x6	I	Eagle.....109-2	2	2275	3 1/2 x 5 1/2	34x4k	34x7k	I	Indep't (Iowa) G	1 1/2	2040	3 1/2 x 5 1/2	34x3 1/2	34x5	I
Beck.....C-4	2	1310	3 1/2 x 5	36x6	36x6	I							Indep't (Ia.) HI	1 1/2	2040	3 1/2 x 5 1/2	34x4	36x7	I	
Beck.....D-50	2 1/2	2395	4 1/2 x 5 1/2	36x7	40x8	W							Indiana.....12	1 1/2-2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5k	W	
Bell.....M (Iowa)	1	1495	3 1/2 x 5 1/2	35x5	35x5n	W	F. W. D.....B	3	4200	4 1/2 x 5 1/2	36x6	36x6	B	Indiana.....20	2	.....	4 1/2 x 5 1/2	36x4k	36x7k	W
Bell.....E (Iowa)	1 1/2	2100	3 1/2 x 5 1/2	34x3 1/2	34x5	I	Fageol.....1 1/2	1 1/2	3900	3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Indiana.....25	2 1/2-3	.....	4 1/2 x 5 1/2	36x4k	36x8k	W
Bell.....O (Iowa)	2	2550	4 1/2 x 5 1/2	34x4	34x6	I	Fageol.....2 1/2	2 1/2	3900	4 1/2 x 5 1/2	34x4	36x7	W	Indiana.....35	3 1/2-4	.....	4 1/2 x 5 1/2	36x5k	36x8dk	W
Bessemer.....G	1	.....	3 1/2 x 5	35x5n	35x5n	I	Fageol.....3 1/2	3 1/2	5000	4 1/2 x 5 1/2	36x5k	40x5dk	W	Indiana.....51	5-7	.....	5 x 6 1/2	36x5k	40x6dk	W
Bessemer.....H-2	1 1/2	.....	3 1/2 x 5	36x3 1/2	36x5	I	Fageol.....5	5	5700	4 1/2 x 5 1/2	36x6	40x6d	W	*International.....S	1	1250	3 1/2 x 5	34x5n	34x5n	I
Bessemer.....J-2	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x4d	I	Fargo.....R	2	1700	3 1/2 x 5	36x4	36x6	I	International.....21	1	1550	3 1/2 x 5 1/2	36x3 1/2	36x3 1/2	I
Bessemer.....K-2	4	.....	4 1/2 x 5 1/2	36x5	36x10	I	*Federal.....1 1/2	1375	3 1/2 x 5	-x5n	-x5n	W	International.....31	1 1/2	1650	3 1/2 x 5 1/2	36x3 1/2	36x3 1/2	I	
Bethlehem.....KN	1	1195	3 1/2 x 5	35x5n	35x5n	B	Federal.....SD	1 1/2	1800	3 1/2 x 5	35x5n	36x6n	W	International.....41	2	2100	3 1/2 x 5 1/2	36x3 1/2	36x5	I
Bethlehem.....CN	2	1395	4 x 5 1/2	36x4k	36x8k	I	Federal.....TE	1 1/2	2175	4 1/2 x 5 1/2	36x3 1/2	36x5	W	International.....61	3	2400	4 1/2 x 5	36x4	36x6	I
Bethlehem.....HN	3	2195	4 x 5 1/2	36x4	36x7	W	Federal.....UE	2-2 1/2	2125	4 1/2 x 5 1/2	36x4	36x7	W	International.....101	5	3600	4 1/2 x 5	36x5	40x10	I
Brinton.....C	2	2500	3 1/2 x 5	34x4	34x5	W	Federal.....WE	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5d	W							
Brinton.....D	3	2775	4 1/2 x 5 1/2	36x4	36x6	W	Federal.....X2	5-6	4500	4 1/2 x 6	36x6	40x6d	W	Jackson.....4WD	3 1/2	3850	4 1/2 x 5 1/2	36x7	36x7	B
Brockway.....E	1	.....	3 1/2 x 5 1/2	35x5n	35x5n	B	*Ford.....T1	1	430	3 1/2 x 4	30x3 1/2	32x4 1/2								

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	
				Front Rear						Front Rear						Front Rear		
Kleiber.....BB	2	\$3600	4 1/2 x 5 1/2	36x4k 36x7k	W	Old Hickory...W	1	\$1775	3 1/2 x 5	36x3 1/2 36x4k	W	Service.....21	1 1/2	....	3 1/2 x 5 1/2	34x3 1/2 34x5	W
Kleiber.....B	2 1/2	3950	4 1/2 x 5 1/2	36x5k 36x8	W	Old Reliable...A	1 1/2	2350	4 x 5	34x4 36x6	W	Service.....32	2	....	4 x 5 1/2	36x3 1/2 36x7	W
Kleiber.....C	3	4600	4 1/2 x 5 1/2	36x5 36x5d	W	Old Reliable...B	2	3500	4 1/2 x 6	34x4 36x4d	W	Service.....37	2	....	4 1/2 x 5 1/2	35x5n 35x7n	W
Kleiber.....D	5	5300	5 x 6 1/2	36x6 40x12	W	Old Reliable...C	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Service.....52	3	....	4 1/2 x 5 1/2	36x4 36x8	W
Koehler.....D	1 1/2	2150	3 1/2 x 5	34x3 1/2 34x5	W	Old Reliable...D	5	5000	4 1/2 x 6	36x6 40x6d	W	Service.....72	3 1/2	....	4 1/2 x 5 1/2	36x5 36x5d	W
Koehler.....M	2 1/2	3175	4 x 5 1/2	36x4 36x7	W	Old Reliable...KLM	7	6000	4 1/2 x 6 1/2	36x6 40x7d	W	Service.....77	4	....	4 1/2 x 6	36x5 36x5d	W
Koehler.....MCS	2 1/2	3275	4 x 5 1/2	36x4 36x7	W	Oldsmobile Econ	1	1095	3 1/2 x 5 1/2	35x5n 35x5n	W	Service.....102	6	....	4 1/2 x 6	36x6 40x6d	W
Koehler.....F	3 1/2	4470	4 1/2 x 5 1/2	36x5 36x10	W	Olympic.....A	1	3200	4 1/2 x 5 1/2	36x4 36x8	W	Signal.....NF	1	\$1450	3 1/2 x 5	34x5n 34x5n	W	
Koehler.....MT. Trac	5	3275	4 x 5 1/2	36x4 36x7	W	Oneida.....B9	1 1/2	2825	4 x 5 1/2	36x3 1/2 36x7	W	Signal.....H	1 1/2	1950	4 1/2 x 5 1/2	34x4 36x6	W	
Krebs.....23	3 1/2	1280	3 1/2 x 5	34x4 1/2 34x4 1/2	B	Oneida.....C9	3	3200	4 x 5 1/2	36x4 36x8	W	Signal.....J	2 1/2	2375	4 1/2 x 5 1/2	34x4 36x8	W	
Krebs.....24	1	1565	3 1/2 x 5	34x5 34x5	W	Oneida.....D9	3 1/2	4050	4 1/2 x 5 1/2	36x5 36x10	W	Signal.....M	3 1/2	3175	4 1/2 x 5 1/2	36x5 40x5d	W	
Krebs.....45	1 1/2	2125	4 1/2 x 5 1/2	36x4 36x7	W	Oneida.....E9	5	4725	4 1/2 x 5 1/2	36x6 40x12	W	Signal.....R	5	3900	4 1/2 x 6	36x6 40x6d	W	
Krebs.....75	2 1/2	2375	4 1/2 x 5 1/2	36x4 36x8	W	Oshkosh.....A	2	3250	3 1/2 x 5	36x6n 36x6n	B	Standard.....75	1 1/2	1330	3 1/2 x 5	33x5n 33x5n	W	
Krebs.....110	3 1/2	2975	4 1/2 x 5 1/2	36x5 40x10	W	Oshkosh.....AA	2	3400	3 1/2 x 5	36x6n 36x6n	B	Standard.....1-K	1 1/2	1601	3 1/2 x 5	34x3 1/2 34x5k	W	
Larabee.....X-2	1	1925	3 1/2 x 4 1/2	34x5n 34x5n	B	Oshkosh.....B	2 1/2	3850	4 x 5 1/2	38x7n 38x7n	B	Standard.....76	2 1/2	2400	4 1/2 x 5 1/2	36x4k 36x7k	W	
Larabee.....U	1 1/2	2100	3 1/2 x 5	34x3 1/2 34x5	W	Oshkosh.....BB	2 1/2	4000	4 x 5 1/2	38x7n 38x7n	B	Standard.....66	3 1/2	3150	4 1/2 x 5 1/2	36x5 36x10	W	
Larabee.....J	1 1/2	2400	3 1/2 x 5	34x3 1/2 34x5k	W	Oshkosh.....BB	2 1/2	4000	4 x 5 1/2	38x7n 38x7n	B	Standard.....5-K	5	4400	4 1/2 x 6	36x6 40x12	W	
Larabee.....K	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x7	W	Overland.....A	1 1/2	450	3 1/2 x 4	30x3 1/2 30x3 1/2	B	Star.....	1 1/2	610b	3 1/2 x 5 1/2	36x3 1/2 36x3 1/2	B	
Larabee.....K-5	2 1/2	3450	4 1/2 x 5 1/2	36x4 36x8	W	Packard.....EC	2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	Sterling.....1	1 1/2	2885	4 x 5 1/2	36x3 1/2 36x5k	W	
Larabee.....L-4	3 1/2	4000	4 1/2 x 5 1/2	36x5 36x5.1	W	Packard.....EX	2-2 1/2	3100	4 1/2 x 5 1/2	36x6n 40x8n	W	Sterling.....2	2	3085	4 x 5 1/2	36x4k 36x6k	W	
Larabee.....W	5-7	4800	4 1/2 x 6	36x6 40x6d	W	Packard.....ED	3 1/2-4 1/2	4100	4 1/2 x 5 1/2	36x5 36x5d	W	Sterling.....2 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x4k 36x4k	W	
Maccar.....L	1 1/2	....	4 1/2 x 5 1/2	36x4 36x6	W	Packard.....EF	5-7 1/2	4500	5 x 5 1/2	36x6 40x6d	W	Sterling.....3 1/2	3 1/2	4325	4 1/2 x 6 1/2	36x5k 40x5k	W
Maccar.....H-A	2	....	4 1/2 x 5 1/2	36x4 36x6d	W	Paige.....52-19	1 1/2	1950	4 x 5 1/2	34x3 1/2 34x5	W	Sterling.....5-W	5	4950	5 x 6 1/2	36x6 40x6d	W
Maccar.....H-2	3	....	4 1/2 x 5 1/2	36x4 36x6d	W	Paige.....54-20	2 1/2	2420	4 1/2 x 5 1/2	34x4 34x8	W	Sterling.....5-C	5	5500	5 x 6 1/2	36x6 40x6d	C
Maccar.....M-3	4	....	4 1/2 x 5 1/2	36x5 36x6d	W	Paige.....51-13	3 1/2	3145	4 1/2 x 5 1/2	36x5 36x5d	W	Sterling.....7 1/2	7 1/2	6000	5 x 6 1/2	36x6 40x7d	C
Maccar.....G	5-6	....	4 1/2 x 6	36x5 40x6d	W	Parker.....C-22	1	1875	3 1/2 x 5 1/2	34x5n 34x5n	W	Stewart.....Utility	1 1/2-11	1245	3 1/2 x 5 1/2	34x4 1/2 34x4 1/2	W
MacDonald.....A	1 1/2	5750	4 1/2 x 6	36x5 40x6d	W	Parker.....G-22	2 1/2	3200	4 1/2 x 6	34x4 36x4d	W	Stewart.....15-11	15-11	1445	3 1/2 x 5 1/2	35x5n 35x5n	I	
Mack.....AB D.R.	1 1/2	3150	4 x 5	36x4 36x3 1/2	D	Parker.....J-20	3 1/2	3950	4 1/2 x 6	36x5 40x6d	W	Stewart.....9	9	1790	3 1/2 x 5	34x3 1/2 34x5	I	
Mack.....AB Chain	1 1/2	3000	4 x 5	36x4 36x3 1/2	D	Parker.....M-20	5	4850	5 x 6	36x6 40x6d	W	Stewart.....7-X	7	2190	4 1/2 x 5 1/2	34x4 34x7	I	
Mack.....AB Chain	2	3300	4 x 5	36x4 36x4d	C	Patriot.....Revere	1	1380	3 1/2 x 5	35x5n 35x5n	W	Stewart.....10-X	10-X	3190	4 1/2 x 5 1/2	36x5 36x5d	I	
Mack.....AB Chain	2 1/2	3750	4 x 5	36x4 36x4d	C	Patriot.....Lincoln	2	2050	4 x 5 1/2	34x3 1/2 34x5	W	Stewart.....10-X	10-X	3190	4 1/2 x 5 1/2	36x5 36x5d	I	
Mack.....AB D.R.	2 1/2	3850	4 x 5	36x4 36x4d	C	Patriot.....Washington	3	2900	4 1/2 x 5 1/2	36x4 36x7	W	Stewart.....10-X	10-X	3190	4 1/2 x 5 1/2	36x5 36x5d	I	
Mack.....AB Chain	2 1/2	3400	4 x 5	36x4 36x4d	C	Pierce-Arrow.....	2	3200	4 x 5 1/2	36x4 36x4d	W	Stoughton.....C	1	1700	3 1/2 x 5 1/2	34x5n 34x5n	W	
Mack.....AC Chain	3 1/2	4950	5 x 6	36x5 40x5d	C	Pierce-Arrow.....	3 1/2	4350	4 1/2 x 6 1/2	36x5 36x5d	W	Stoughton.....B	1 1/2	2150	3 1/2 x 5 1/2	34x5n 34x5n	W	
Mack.....AC Chain	5	5500	5 x 6	36x6 40x6d	C	Pierce-Arrow.....	5	4850	4 1/2 x 6 1/2	36x5 40x6d	W	Stoughton.....D	2	2490	4 x 5 1/2	36x4 36x7	W	
Mack.....AC Chain	6 1/2	5750	5 x 6	36x6 40x6d	C	Pittsburgher.....	1 1/2-2	3000	3 1/2 x 5	36x4 36x6	W	Stoughton.....F	3	3150	4 1/2 x 5 1/2	36x5d 36x5d	W	
Mack.....AC Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Pittsburgher.....	3	3800	4 x 5 1/2	36x5k 36x8	W	Sullivan.....E	2	2800	4 1/2 x 5 1/2	36x4k 36x7k	W	
Mack Trac.....AB	5	3400	4 x 5	36x4 36x4d	C	Power.....F	2	3150	4 x 5 1/2	36x5 36x7	W	Sullivan.....H	3 1/2	3750	4 1/2 x 6	36x5 36x5d	W	
Mack Trac.....AC	7	4950	5 x 6	36x5 40x5d	C	Power.....C	3 1/2	....	4 1/2 x 5 1/2	36x5 40x10	W						
Mack Trac.....AC	10	5500	5 x 6	36x6 40x6d	C	Premcar.....B-143	1 1/2	2475	3 1/2 x 5	36x6n 36x6n	W							
Mack Trac.....AC	13	5750	5 x 6	36x6 40x6d	C													
Mack Trac.....AC	15	6010	5 x 6	36x7 40x7d	C													
*Mapleleaf.....	1 1/2	3000	3 1/2 x 5 1/2	34x5n 36x5n	W	*Rainier.....R-21	3 1/2	....	3 1/2 x 5	35x5n 35x5n	W	*Thomart.....	1 1/2	1795	4 x 5 1/2	34x5 34x5	(
*Mapleleaf.....AA**	2	3600	4 x 5 1/2	36x4 36x7	W	Rainier.....R-29	1 1/2	....	3 1/2 x 5	34x3 1/2 34x4	W	Tiffin.....GW	1 1/2	2100	4 1/2 x 5 1/2	36x3 1/2 36x5	W
*Mapleleaf.....BB**	3	4050	4 1/2 x 5 1/2	36x4 36x4d	W	Rainier.....R-26	1 1/2	....	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin.....MW	2 1/2	2700	4 1/2 x 5 1/2	36x4 36x3 1/2	W
*Mapleleaf.....CC**	4	4800	4 1/2 x 5 1/2	36x5 36x5d	W	Rainier.....R-28	2	....	3 1/2 x 5	34x4 34x6	W	Tiffin.....PW	3 1/2	3600a	4 1/2 x 5 1/2	36x5 40x5d	W
*Mapleleaf.....DD**	5	5625	4 1/2 x 5 1/2	36x6 40x6d	W	Rainier.....R-20	2 1/2-3	....	3 1/2 x 5	34x4 34x7	W	Tiffin.....PW	5	4300	4 1/2 x 6	36x5 40x6d	W
Master.....JW	1 1/2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Rainier.....R-15	3 1/2-5	....	3 1/2 x 5	36x5 36x5d	W	Tiffin.....UW	6	4500	4 1/2 x 6	36x6 40x12	W
Master.....JD	1 1/2	2590	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Rainier.....R-17	5-6	....	3 1/2 x 5	36x6 40x6d	W	Titan.....	2	2750	4 x 5	36x4k 36x7k	D
Master.....Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Ranger.....TK-20-2	1 1/2	2450	3 1/2 x 5	36x6n 38x7n	W	Titan.....	2 1/2	2950	4 1/2 x 5 1/2	36x4k 36x8k	D	
Master.....W	2 1/2	2890	4 1/2 x 5 1/2	34x4 36x7	W	*Reo.....F-7	1 1/2	1245	4 1/2 x 4 1/2	31x4 1/2 31x4 1/2	B	Titan.....	3 1/2	3950	4 1/2 x 6	36x5k 40x10k	D	
Master.....DD	2 1/2	3190	4 1/2 x 5 1/2	34x4 36x7	D	Reliance.....10A	1 1/2	2400	4 x 5 1/2	36x3 1/2 36x5	I	Titan.....	5	4550	4 1/2 x 6	36x5 40x12	D	
Master.....A	3 1/2	3990	4 1/2 x 6	36x5 40x5d	W	Reliance.....20B	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x4d	I	Tower.....J	1 1/2	2000	4 1/2 x 5 1/2	35x5n 38x7n	W	
Master.....E	3 1/2	4290	4 1/2 x 6	36x5 40x5d	D	Republic.....75	3 1/2	1395b	3 1/2 x 5	32x4 1/2 32x4 1/2	I	Tower.....H	2 1/2	2475	4 1/2 x 5 1/2	36x4 36x7	W	
Master.....Y	4	4490	4 1/2 x 6	36x5 40x6d	D	Republic.....10	1	1395	3 1/2 x 5	34x3 34x4	I	Tower.....G	3 1/2	3475	4 1/2 x 5 1/2	36x5 36x5d	W	
Master.....B	5	4990	4 1/2 x 6	36x6 40x6d	D	Republic.....10 Exp	1	1695	3 1/2 x 5	34x4 34x5n	I	Traffic.....C	2	1595a	3 1/2 x 5	35x5n 35x5n	I	
Master.....F	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....11X	1 1/2	1795	3 1/2 x 5	34x4 34x6	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Traffic.....C	3	1895a	3 1/2 x 5	36x4 36x7	I	
Master.....B	5	5090	4 1/2 x 6	36x6 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x								

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive
Vim.....30	3 1/2	\$1175	3 1/2x4 1/2	32x4 1/2 32x4 1/2	W	White.....20	2	\$3250	3 1/2x5 1/2	36x4k 36x7k	D	Wichita.....O	4	\$3500	4 1/2x6 1/2	36x5k 36x5k	W
*Vim.....50	5 1/2	995	4 x5	32x4n 32x4n	B	White.....40	3 1/2	4200	3 1/2x5 1/2	36x5 40x8d	D	Wilcox.....AA	1	1900	3 1/2x5 1/2	36x4k 36x4k	W
Vim.....31	1	1975	3 1/2x5 1/2	35x5n 35x5n	W	White.....45	5	4500	4 1/2x5 1/2	36x6 40x8d	D	Wilcox.....BB	1 1/2	2550	4 1/2x5 1/2	36x4 36x5	W
Vim.....23	2	3150	3 1/2x5 1/2	36x4 36x6	W	White Hick.....E	1	1225	3 1/2x5	34x5n 34x5n	W	Wilcox.....D	2 1/2	3000	4 1/2x5 1/2	36x4k 36x3 1/2k	W
Vim.....22	3	3050	4 1/2x5 1/2	36x5 36x5d	W	White Hick.....H	1 1/2	1375	3 1/2x5 1/2	36x5 36x5	W	Wilcox.....E	3 1/2	3950	4 1/2x5 1/2	36x5k 36x5k	W
Walker-JohnsonA	2	2250	3 1/2x5	34x3 1/2 34x6	W	White Hick.....K	2 1/2	1675	4 1/2x5 1/2	36x4 36x5	W	Wilcox.....F	5	4350	4 1/2x5 1/2	36x5 40x8d	W
Walker-JohnsonB	3	2750	4 1/2x5 1/2	36x4 36x8	W	White Hick.....K	2	1875	3 1/2x5 1/2	36x3 1/2 36x4k	W	Wilson.....F	1 1/2	2270	3 1/2x5	36x3 1/2 36x5	W
Walker.....M	2 1/2	3850	4 1/2x5 1/2	36x4 36x8	D	White Hick.....M	1	2400	3 1/2x5 1/2	36x3 1/2 36x6k	W	Wilson.....EA	2 1/2	2825	4 1/2x5 1/2	36x4 36x7	W
Walker.....S	5	4850	4 1/2x5 1/2	36x6 40x8d	W	White Hick.....RX	3	3200	4 1/2x5 1/2	36x4k 36x8k	W	Wilson.....G	3 1/2	3685	4 1/2x5 1/2	36x5 36x5	W
*Watson.....C	1	1485a	3 1/2x5 1/2	35x5n 35x5n	W							Wilson.....H	5	4520	4 1/2x5 1/2	36x6 40x6	W
Watson.....N	3	4250	4 1/2x5 1/2	36x5 36x10	W							*Wisconsin.....A	1	1750	3 1/2x5	34x5n 34x5n	W
Western.....W1	1 1/2	2550	3 1/2x5 1/2	36x3 1/2 36x5k	W							Wisconsin.....B	2 1/2	2100	3 1/2x5	35x5 36x6	W
Western.....L1	1 1/2	2550	3 1/2x5 1/2	36x3 1/2 36x5k	W							Wisconsin.....C	2 1/2	2700	4 x5 1/2	36x6n 36x7	W
Western.....W2	2 1/2	3250	4 1/2x5 1/2	36x4 36x7	W							Wisconsin.....D	3 1/2	3000	4 1/2x5 1/2	36x6n 40x8	W
Western.....L2	2 1/2	3250	4 1/2x5 1/2	36x4 36x7	W							Wisconsin.....E	5	3500	4 1/2x5 1/2	36x6 36x10	W
Western.....W3	3 1/2	4250	4 1/2x5 1/2	36x5 40x5d	W							Wisconsin.....F	7	4000	5 x6 1/2	36x6 36x12	W
*White.....15	3 1/2	2400	3 1/2x5 1/2	34x5n 34x5n	B							Witt-Will.....N	1 1/2	2450	3 1/2x5	36x3 1/2 36x5k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl., all others are 4 cyl.
d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. — express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity
Allis-Chal. G.P.	6-12	\$250	2	Leit.	4-3 1/2x4 1/2	Gas.	1	Fordson.....	18	\$395	4	Own	4-4x5	G,K	2	*Oldsmar.....K	2 1/2-5	\$225	4	Own	1-5 1/2x5 1/2	Gas.	1
Allis-Chalm.....	15-25	1185	4	Midw.	4-4 1/2x5 1/2	Gas.	3	Franklin.....G	18-30	4000	*2	Clim.	4-5 x6 1/2	G or K	3-4	Peoria.....L	12-25	1600	4	Clim.	4-5 x6 1/2	G,K	3
Allis-Chalm.....	20-35	1885	4	Own	4-4 1/2x6 1/2	GorK	3-4	Franklin.....C	18-30	3350	*2	Clim.	4-5 x6 1/2	G or K	3-4	Pioneer.....G	18-36	1750	4	Own	4-5 1/2x6	G or K,D	4
Allis-Chalm.....	20-35	2085	4	Own	4-4 1/2x6 1/2	G	4	Franklin.....G2	18-30	4350	*2	Clim.	4-5 x6 1/2	G or K	3-4	Pioneer.....C	40-75	3550	4	Own	4-7 x8	Gas.	10
Allwork.....2-G	14-28	1595	4	Own	4-4 1/2x6	GorK	3	Fricks.....A	12-20	.....	4	Erd.	4-4 x6	G,K	2-3	Plowman.....A	15-30	1295	4	Buda	4-4 1/2x6	G,K	3-4
Allwork.....C	14-28	1395	4	Own	4-5 x6	GorK	3	Fricks.....C	15-28	.....	4	Beav.	4-4 1/2x6	G,K	3-4								
*ARO 1921-22	3-6	385	4	Own	1-4 1/2x6	Gas.	1	Grain Belt.....A	18-36	2150	4	Wauk.	4-4 1/2x6 1/2	G or K	4	Reliable.....	10-20	390	4	Own	2-6 x7	Ker.	2
*Beman-T.....	15-30	199	4	Clim.	4-5 x6 1/2	G,K	4	Gray.....	20-36	1975	3	Wauk.	4-4 1/2x6 1/2	Gas.	4	Rex.....	12-25	1600	4	Wauk	4-4 1/2x6 1/2	G or K	3
*Beman-T.....	22-45	2810	4	Own	4-5 1/2x8	G,K	6	Gray.....	22-44	2165	3	Wauk.	4-5 x6 1/2	Gas.	4-5	Russell.....	12-21	1500	4	Own	4-4 1/2x6 1/2	G or K	2-3
*Beman-T.....	30-60	4710	4	Own	4-7 x9	G,K,D	8-10	Gray.....	22-44	2165	3	Wauk.	4-5 x6 1/2	Gas.	4-5	Russell.....	15-30	2200	4	Own	4-5 x6 1/2	G or K	3-4
Automot. B-3	12-21	1250	4	Here.	4-4 x5 1/2	Gas.	2-3	Gt. Western St	20-30	1950	4	Beav.	4-4 1/2x6	K	4	Russell.....	20-35	3000	4	Own	4-5 1/2x7	G or K	4-5
Avery, S.R. Cul.	5-10	.....	4	Own	4-3 x4	G,K	2									Russell.....	30-60	5000	4	Own	4-8 x10	G or K	8-10
Avery, Cult-C	5-10	.....	4	Own	4-3 x4	G,K	2	Hart-Parr.....20	20	765	4	Own	2-5 1/2x6 1/2	K,D	2	Samson.....M	.....	445	4	Own	4-4 x5 1/2	G,K	2
Avery.....B	5-10	.....	4	Own	4-3 x4	G,K	2	Hart-Parr.....30	30	895	4	Own	2-6 1/2x7	K,D	3	Sandusky.....J	10-20	1250	4	Own	4-4 1/2x6 1/2	G,K,D	4
Avery.....C	5-10	.....	4	Own	4-3 x4	G,K	2	Heider.....D	9-16	870	4	Wauk	4-4 1/2x6 1/2	G,K	2	Sandusky.....E	15-35	1750	4	Own	4-5 x6 1/2	G,K,D	4
Avery.....	8-14	.....	4	Own	2-5 1/2x6	G,K,D	2-3	Heider.....C	12-20	995	4	Wauk	4-4 1/2x6 1/2	G,K	3	*Shelby.....	1	150	3	B & S	1-2 1/2x2 1/2	G	.....
Avery.....	12-20	.....	4	Own	4-4 1/2x6	G,K,D	3-4	Heider.....C	12-20	995	4	Wauk	4-4 1/2x6 1/2	G,K	3	Shelby.....D	15-30	.....	4	Beav.	4-4 1/2x6	G,K	3
Avery.....	12-20	.....	4	Own	2-6 1/2x7	G,K,D	3-4	Huber Light 4	12-25	985	4	Wauk	4-4 1/2x6 1/2	G or K	3	Shelby.....C	9-18	.....	4	Wauk	4-3 1/2x6 1/2	G or K	2
Avery.....	14-21	.....	4	Own	4-4 1/2x6	G,K,D	3-4	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2x6	G	3	Steady Pull.....	12-21	1485	4	Own	4-4 x5	Gas.	3
Avery.....	18-36	.....	4	Own	4-5 1/2x6	G,K,D	4-5																
Avery.....	25-50	.....	4	Own	4-6 1/2x7	G,K,D	5-6																
Avery.....	45-65	.....	4	Own	4-7 1/2x8	G,K,D	8-10																
Bates Mule. H	15-25	.....	4	Midw.	4-4 1/2x5 1/2	Gas.	3	Illinois.....C	15-30	.....	4	Clim.	4-5 x6 1/2	G,K	4	Toga.....3	18-32	.....	4	Wise.	4-4 1/2x6	Gas.	3-4
Bates Mule. F	18-25	.....	*2	Midw.	4-4 1/2x5 1/2	Gas.	3	Indiana.....F	5-10	665	2	Leit.	4-3 1/2x4 1/2	Gas.	1-2	Toro Cultivator	6-10	750	3	Leit	4-3 1/2x4 1/2	Gas.	2
Bates Mule G	25-35	.....	*2	Midw.	4-4 1/2x6	Gas.	3	International	8-16	1670	4	Own	4-4 1/2x6	G,K,D	3	Toro Tractor 22	8-10	495	3	Leit	4-3 1/2x4 1/2	Gas.	2-3
Bear.....	25-35	4250	*2	Stc.	4-4 1/2x6 1/2	Gas.	4	Internat. Titan	10-20	1700	4	Own	2-4 1/2x8	G,K,D	3	Townsend.....	15-30	800	2	Own	4-6 1/2x7	Ker.	3-4
*Beeman.....G	2-4	240	4	Own	1-3 1/2x4 1/2	Gas.	4	International	15-30	1750	4	Own	4-5 1/2x8	G,K,D	4	Townsend.....	15-30	1350	2	Own	4-7 x8	Ker.	3-4
Best.....	30	.....	*2	Own	4-4 1/2x6 1/2	G,K,D	4	J-T.....N	25-40	3000	*2	Clim.	4-5x6 1/2	G,K,D	3-4	Townsend.....	25-50	2500	2	Own	4-8 1/2x10	Ker.	4-8
Best.....	60	.....	*2	Own	4-6 1/2x8 1/2	G,K,D	8-9																
Boring.....	5-10	395	4	LeR.	4-3 1/2x4 1/2	G	4	*Kinkade.....	1 1/2	190	1	Own	1-3 x3	Gas.	.....	Traction Motor	40-50	.....	4	Leit.	8-3 1/2x5	Gas.	4-5
Boring.....	15-30	1850	3	Wauk	4-4 1/2x5 1/2	GorK	2	La Crosse.....	12-24	985	2	Own	2-6 x7	G,K	3	Traylor.....TB	6-12	500	4	Leit.	4-3 1/2x4 1/2	Gas.	1-2
Bryan.....	15-30	.....	4	Own	2-4 x5	K.	3	Lauson.....5	12-25	1295	4	Midw.	4-4 1/2x6 1/2	Gas.	3	Trundar.....10	25-40	3750	*2	Wauk	4-5 x6 1/2	G or K	4
								Lauson.....21	15-30	1675	4	Beav.	4-4 1/2x6	G or K	3-4	Twin City.....	12-20	1203	4	Own	4-4 1/2x6	G,K	3
Capital.....	15-30	1000	2	Own	4-4 1/2x6	Gas.	3	Leader.....B	12-18	685	4	Own	2-6 x6 1/2	G,K,D	2-3	Twin City.....	20-35	2750	4	Own	4-5 1/2x6 1/2	G,K	5-6
Case.....	12-20	1050	4	Own	4-4 1/2x5 1/2	G,K,D	3	Leader.....N	16-32	1725	4	Clim.	4-6 x6 1/2	G,K	3-4	Twin City.....	40-65	4750	4	Own	4-7 1/2x9	G,K	8-10
Case.....	12-20	.....	4	Own	4-4 1/2x5	G,K,D	2	Leader.....GU	18-35	2150	*2	Clim.	4-5 x6 1/2	G,K	3-4	Uncle Sam C20	12-20	1295	4	Weid.	4-4 x5 1/2	G	2-3
Case.....	15-27	1320	4	Own	4-4 1/2x6	G,K,D	3-4	Leader.....H4J	40-45	4500	*2	Cont.	4-4 1/2x6 1/2	Gas.	4	Uncle Sam B19	20-30	1985	4	Beav.	4-4 1/2x6	G or K	3-4
Case.....	22-40	2550	4	Own	4-5 1/2x6 1/2	G,K,D	4-5	Linn.....W	60	5000	*2	Wauk	4-5 x6 1/2	Gas.	6	Uncle Sam D21	20-30	1895	4	Beav.	4-4 1/2x6	G or K	3-4
Case.....	40-72	5200	4	Own	4-7 x8	G,K,D	8-10	Linn.....W	60	5000	*2	Wauk	4-5 x6 1/2	Gas.	6	Utilitor.....501	2 1/2-4	295	4	Own	1-3 1/2x4 1/2	G	1
Caterpillar T35	15	.....	*2	Own	4-4 x5 1/2	Gas.	3	Little Giant. B	16-22	2200	4	Own	1-5 1/2x6	K	6	Utilitor.....501A	2 1/2-4	340	4	Own	1-3 1/2x4 1/2	G	1
Caterpillar ST	25	.....	*2	Own	4-4 1/2x6	Gas.	4	Little Giant. A	20-35	3300	4	Own	1-5 1/2x6	K	6	Wallis.....K	15-25	.....	4	Own	4-4 1/2x5 1/2	G,K	3
Caterpillar 10T	40	.....	*2	Own	4-6 1/2x7	Gas.	6	Lombard. 1922	85-150	8950	*2	Wise.	6-5 1/2x6 1/2	Gas.	16	Waterloo.....N	12-25	675	4	Own	2-6 1/2x7	Ker.	3
Centaur.....	5-2 1/2	345	2	N Way	2-4 1/2x4 1/2	GorK	1	Lombard. 1922	50	5300	*2	Wise.	4-4 1/2x6 1/2	Gas.	6-10	Wetmore 21-22	12-25	1185	4	Wauk	4-4 x5 1/2	G,K	3
Chicago.....40	40	2500	4	Own	4-4 1/2x																		



The Big, Broad Market for Cars Inevitably Points to the "Four"



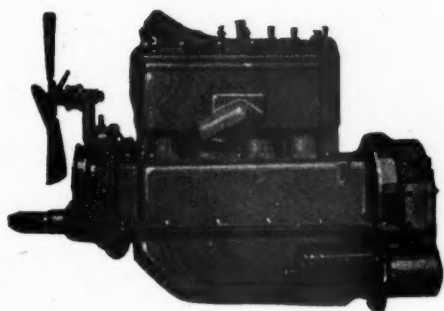
The average buyer is insisting on getting balanced value in the car he buys. Further, he is conscious of the need for economy in operation and up-keep.

To this man, a car manufacturer can offer appealing quality by building around a soundly good "four."

In the right four-cylinder motor he can offer the average buyer in the big market all the essential things any motor can do. With such a motor he can afford to build into body and chassis equally good value and yet sell his complete car within the price limits of the big market for moderate priced cars.

The Lycoming Motor is peculiarly fitted to the requirements of this market — essentially a "four" market. Simple, dependable, economical, the Lycoming Motor is built in the largest plant in the world devoted exclusively to the manufacture of four cylinder motors.

A more satisfactory description of this remarkable motor that is giving satisfaction to more than 200,000 car and truck owners will be mailed you on request.



Lycoming Motors Corporation
Williamsport, Pennsylvania

Lycoming

MOTORS

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	
Ambassador.....R	Cont.	6-3 1/2 x 5 1/4	136	33x5	b4500	\$4500	\$6500	Lincoln.....	Ow.	8-3 1/2 x 5	136	33x5	\$3800	b3800	\$3800	\$4400	\$4700
American.....D-66	H-S.	6-3 1/2 x 5	127	33x4 1/2	b1885	1785	1850	2485	Locomobile.....	48	Ow.	6-4 1/2 x 5 1/2	142	35x5	b7600	7600	10500	11000
Anderson.....Aluminum 6	Cont.	6-3 1/2 x 4 1/2	114	32x4	1195	Marmon.....	34	Ow.	6-3 1/2 x 5 1/2	136	32x4 1/2	3385	b3185	3185	3985	4385
Anderson.....Series 40	Cont.	6-3 1/2 x 4 1/2	120	33x4	1405	1195	1595	1995	1995	Maxwell.....	Ow.	4-3 1/2 x 4 1/2	109	31x4	885	885	885	1235	1335	
Apperson.....8-21-S	Ow.	8-3 1/2 x 5	130	34x4 1/2	2620	2645	3625	3695	McFarlan.....	1222	Ow.	6-4 1/2 x 6	140	33x5	6300	b6300	6300	7500	7500
Auburn.....6-51	Cont.	6-3 1/2 x 4 1/2	121	32x4	1575	1475	2275	2345	2345	Mercer.....Series 5	Ow.	4-3 1/2 x 6 1/2	132	32x4 1/2	3950	b3950	3950	4850	5250	
Auburn.....6-51	Cont.	6-3 1/2 x 4 1/2	121	32x4 1/2	.....	n1995	1545	.....	.....	Merit.....	Cont.	6-3 1/2 x 4 1/2	119	32x4	1895	1895	1895	.....	.....
Bay State.....	Cont.	6-3 1/2 x 4 1/2	121	32x4	1800	1800	2400	2500	2500	Mitchell.....F-50	Ow.	6-3 1/2 x 5	120	32x4	a1490	1590	b1850m	b2050	2275	
Biddle.....B1 & B5	Buda.	4-3 1/2 x 5 1/2	121	32x4	2950	b2950	3950	3950	3950	Mitchell.....F-50	Ow.	6-3 1/2 x 5	127	32x4 1/2	.....	1690	.....	.....	.....
Brewster.....91	Ow.	4-4 x 5 1/2	125	32x4 1/2	5000	5000	7000	7000	7000	Monroe.....1922-S-9	Ow.	4-3 1/2 x 4 1/2	115	33x3 1/2	950	950	.....	.....	.....
Buick.....1922-34-5-6-7-33	Ow.	4-3 1/2 x 4 1/2	169	31x4	865	885	u 725	1175	1395	Moon.....6-40	Cont.	6-3 1/2 x 1 1/2	115	31x4	.....	1295	.....	.....	1695
Buick.....1922-41-4-5-47	Ow.	6-3 1/2 x 4 1/2	118	33x4 1/2	1175	1195	u975	1935	1935	Moon.....6-58	Cont.	6-3 1/2 x 4 1/2	128	33x4 1/2	1785	1785	1785	2785	2785	
Buick.....1922-48-9-50-4-55	Ow.	6-3 1/2 x 4 1/2	124	34x4 1/2	n1625v	n1675v	1435	1895	2195	Nash.....691-96-97	Ow.	6-3 1/2 x 5	121	33x4	1210	1240	b1395m	.....	2040
Cadillac.....61	Ow.	8-3 1/2 x 5 1/2	132	33x5	3100	3150	3150	b3875	4100	Nash.....692-94-95	Ow.	6-3 1/2 x 5	127	34x4 1/2	.....	1390	b1890	2190	2190
Case.....X	Cont.	6-3 1/2 x 4 1/2	122	32x4 1/2	1750	1790	.....	2550	2690	Nash Four.....41-A	Ow.	4-3 1/2 x 5	112	33x4	915	935	.....	a1385	1545
Case.....W	Cont.	6-3 1/2 x 4 1/2	129	34x4 1/2	.....	2200	2250	2850	3250	National.....BB	Ow.	6-3 1/2 x 5 1/2	130	32x4 1/2	a2475	b2475	2375	b3725	3825
Chalmers.....1922	Ow.	6-3 1/2 x 4 1/2	117	32x4	1185	1185	.....	1595	2295	Noma.....3C	Cont.	6-3 1/2 x 4 1/2	128	32x4 1/2	2500	b2500	c2600	.....	3500
Chalmers.....1922	Ow.	6-3 1/2 x 4 1/2	122	32x4	.....	1345	.....	1995	2295	Noma.....1D	Bea.	6-3 1/2 x 5 1/2	128	32x4 1/2	3000	b3100	c3200	.....	5500
Chandler.....Six	Ow.	6-3 1/2 x 5	123	33x4	1495	b1495	1645	b1995	2295	Norwalk.....430-KS	Lye.	4-3 1/2 x 5	116	32x3 1/2	.....	1035	.....	.....	.....
Chevrolet.....Superior	Ow.	4-3 1/2 x 4	102	30x3 1/2	510	525	u425	b840	860	Oakland.....6-44	Ow.	6-2 1/2 x 4 1/2	115	32x4	975	995	b1165m	b1445	1545	
Chevrolet.....F2	Ow.	4-3 1/2 x 5 1/2	110	33x4	865	885	.....	1325	1395	Ogren.....6 T D Luxe	Cont.	6-3 1/2 x 5 1/2	134	33x5	b3750	3750	3850	4500	4800
Cleveland.....41	Ow.	6-3 x 4 1/2	112	32x4	1085	1095	n1260	1495	1585	Oldsmobile.....43 A	Ow.	4-3 1/2 x 5 1/2	115	32x4	1095	1095	b1225m	1595	1745	
Cole.....890	Nort.	8-3 1/2 x 4 1/2	127 1/2	33x5	2685	b2685m	2685	b3385	3685	Oldsmobile.....46	Ow.	8-2 1/2 x 4 1/2	122	32x4 1/2	b1735	c1850	1735	.....	2635
Columbia.....De Luxe	Cont.	6-3 1/2 x 4 1/2	115	32x4	1475	b1475m	b1925	1995	1995	Oldsmobile.....47	Ow.	8-2 1/2 x 4 1/2	115	32x4	1495	1495	b1725m	1995	2145	
Columbia.....Light Six	Cont.	6-3 1/2 x 4 1/2	115	31x4	995	985	.....	1395	1985	Overland.....4	Ow.	4-3 1/2 x 4	100	30x3 1/2	550	550	.....	850	895
Comet.....C-53	Cont.	6-3 1/2 x 5 1/2	125	33x4 1/2	.....	1985	2085	2985	2985	Packard.....Single-Six	Ow.	6-3 1/2 x 5	126	33x4 1/2	2485	2485	u2250	3175	3275
Courier.....	Ow.	6-3 1/2 x 4 1/2	116	32x4	a1395	1395	b1495m	2065	2165	Packard.....Single-Six	Ow.	6-3 1/2 x 5	133	33x4 1/2	.....	u2350	2685	.....	3525
Crawford.....22-6-60	Cont.	6-3 1/2 x 5 1/2	122 1/2	32x4	3000	3000	3000	.....	4500	Packard.....Twin-Six	Ow.	12-3 x 5	136	33x5	3850	3850	3850	5240	5400
Crawford-Dagner.....6-60	Cont.	6-3 1/2 x 5 1/2	135	33x5	.....	n3500	.....	.....	.....	Paige.....6-44	Ow.	6-3 1/2 x 5	119	33x4	1465	1465	u1290	1995	2245
Daniels.....D-19	Ow.	8-3 1/2 x 5 1/2	132	33x5	a4350	b4350	4350	5250	6000	Paige.....6-66	Cont.	6-3 1/2 x 5 1/2	131	33x4 1/2	a2495	e2245	2195	3100	3155	
Davis.....71	Cont.	6-3 1/2 x 4 1/2	114	31x4	.....	1295	.....	2095	2195	Peterson.....22-6-52	Cont.	6-3 1/2 x 4 1/2	120	32x4 1/2	.....	1390	1425	2395	2395
Davis.....61-67	Cont.	6-3 1/2 x 4 1/2	120	32x4	1595	1595	b1695	2095	2195	Peerless.....56-S-7	Ow.	8-3 1/2 x 5	128	33x5	.....	b2990	2990	b3400	3900
Dixie Flyer.....H-S-7	H-S.	4-3 1/2 x 6	112	32x4	1175	1175	b1295	1545	1595	Pierce-Arrow.....	Ow.	6-4 x 5 1/2	138	33x5	5250	b5250	5250	6800	7000	
Dodge Brothers.....	Ow.	4-3 1/2 x 4 1/2	114	32x4	850	880	.....	980h	1440	Pilot.....6-50	H-S.	6-3 1/2 x 5	126	32x4 1/2	2050	2050	2050	2950	3000
Dorris.....6-80	Ow.	6-4 x 5	132	33x5	.....	b3900	3950	4985h	5750	Premier.....6-D	Ow.	6-3 1/2 x 5 1/2	126 1/2	33x5	3150	b3100	3250	4300	5100
Dort.....19-14	D-Ly.	4-3 1/2 x 5	108	31x4	885	885	.....	1265	1385	Premocar.....6-40-A	Falls.	6-3 1/2 x 4 1/2	117	32x4	1095	1095	.....	1750	1825
Driggs.....	Ow.	4-2 1/2 x 4 1/2	104	30x3 1/2	1275	1275	.....	1975	1975	R & V Knight.....R	Ow.	4-3 1/2 x 5	116	32x4	.....	1665	.....	2385	2475
Duesenberg.....Straight 8	Ow.	8-2 1/2 x 5	134	33x5	6500	6500	6750	7800	7800	R & V Knight.....T6 & U6	Ow.	6-3 1/2 x 4 1/2	127	32x4 1/2	2475	b2475	2475	3015	3105	
Du Pont.....A	Ow.	4-3 1/2 x 5 1/2	124	32x4 1/2	3000	3200	.....	3800	4000	Ree Series.....T6 & U6	Ow.	6-3 1/2 x 5	120	33x4	1595	n1645	1485	b2355	2435
Durant.....A-22	Cont.	4-3 1/2 x 4 1/2	109	31x4	n890	890	.....	1365	1365	Revere.....C	Dues.	4-1 1/2 x 6	131	32x4 1/2	3200	3200	3200	.....	4000
Durant.....B-22	Anst.	6-3 1/2 x 4 1/2	123 1/2	32x4 1/2	1600	1650	.....	2250	2400	Rickenbacker.....A	Ow.	6-3 1/2 x 5 1/2	117	32x4	.....	1485	.....	1885	1985
Earl.....40	Ow.	4-3 x 5 1/4	112	32x4	1485	1095	950n	b1395	1795	Roamer.....6-54-E	Cont.	6-3 1/2 x 5 1/2	128	32x4 1/2	2850	b2585	2785	3850	3850	
Elcar.....K-4	Lye.	4-3 1/2 x 5	118	33x4	1095	1095	n1095	1345	.....	Roamer.....4-75-E	Dues.	4-4 1/2 x 6	128	32x4 1/2	3985	b3585	b3750m	.....	b4650
Elcar.....7-R	Cont.	6-3 1/2 x 4 1/2	118	33x4	1395	1395	n1395	2085	2165	Rolls-Royce.....	Ow.	6-4 1/2 x 4 1/2	143 1/2	33x5	.....	10,900	.....	.....	.....
Elgin.....K-1	Falls.	6-3 1/2 x 4 1/2	118	33x4	1345	1295	b1345	1695	1695	Saxon.....125	Ow.	4-3 1/2 x 5	112	32x4	1195	1195	.....	1795	1795
Essex.....	Ow.	4-3 1/2 x 5	108 1/2	32x4	.....	1095	.....	1195k	1295k	Sayers Six.....DP	Cont.	6-3 1/2 x 4 1/2	118	33x4	1645	1645	.....	2645	2645
Ford.....T	Ow.	4-3 1/2 x 4	100	30x3 1/2	r319	s348	u285	580	645	Seneca.....L-2 & O-2	Lye.	4-3 1/2 x 5	108	30x3 1/2	875	875	.....	.....	.....
Fox.....	Ow.	4-3 1/2 x 4	132	32x4 1/2	3900	3900	4900	4900	4900	Seneca.....50 & 51	Lye.	4-3 1/2 x 5	112	31x4	1095	1095	.....	1685	1685
Franklin.....9-B	Ow.	6-3 1/2 x 4	115	32x4	1900	1950	u1750	2750	2850	Sperling.....A	Supr.	4-3 1/2 x 5	114	32x4	980	980	.....	1685	1685
Gardner.....T-R & G	Lye.	4-3 1/2 x 5	112	32x4	895	895	.....	1095k	1345	Standard.....98	Ow.	8-3 1/2 x 5	127	34x4 1/2	2150	b2500	2500	2750	3200
Grant.....	Walk'r	6-3 1/2 x 4 1/2	116	32x4	1385	1385	.....	1895	1945	Stanley.....	Ow.	2-4 x 5	130	32x4 1/2	2700	2700	2700	3775	3950
Gray.....	Ow.	4-3 1/2 x 4	100	30x3 1/2	.....	490	.....	760	760	Stanwood Six.....	Cont.	6-3 1/2 x 4 1/2	118	33x4	1765	1765	.....	2750	.....
H.C.S.....Series 3	Weid.	4-3 1/2 x 5 1/2	120	32x4 1/2	2475	2475	.....	3250	3475	Star.....	Cont.	4-3 1/2 x 4 1/2	102	30x3 1/2	r319	s348	u285	580	645
Handley-Knight.....	Ow.	4-4 1/2 x 4 1/2	125	32x4 1/2	.....	2650	3450	3450	3450	Stearns-Knight.....SKLA	Ow.	4-3 1/2 x 5 1/2	125	34x4 1/2	2250	2250	2450	3150	3450
Hanson.....30	Cont.	6-3 1/2 x 4 1/2	114	31x4	.....	995	.....	1950	1950	Stearns-Knight.....6	Ow.	6-3 1/2 x 5	130	34x4 1/2	2700	2700	2850	3350	3700
Hanson Six.....60	Cont.	6-3 1/2 x 4 1/2	121	32x4	1595	1595	1795	b2475	2585	Stevens-Duryea.....E	Ow.	6-4 1/2 x 5 1/2	138	35x5	7250	b6900	6800	u5600	b8900	
Hatfield.....A-42	H-S.	4-3 1/2 x 5	115	32x4	1345	1345	b1345	1950	1950	Studebaker.....Light Six	Ow.	6-3 1/2 x 4 1/2	112	32x4	975	975	u785	1225	1550	
Haynes.....75	Ow.	4-3 1/2 x 5	132	34x4 1/2	2395	b2395	2395	3395	3395	Studebaker.....Special Six	Ow.	6-3 1/2 x 5	119	32x4	1250	1275	b1275	1875	2050	
Haynes.....55	Ow.	6-3 1/2 x 5	121	32x4 1/2	1545	1495	.....	2095	2395	Studebaker.....Big Six	Ow.	6-3 1/2 x 5	126	33x4 1/2	u1300	1650	n1785	2275	2475
Holmes.....Series 4	Ow.	6-3 1/2 x 4 1/2	126	34x4 1/2	.....	b2500	2500	b3300	3600	Stutz.....	Ow.	4-4 1/2 x 6	139	32x4 1/2	2450	b2790	c2674	3490	4450
Hudson.....Super 6	Ow.	6-3 1/2 x 5	126	34x4 1/2	.....	b1648	1695	2570	2295	Templar.....A-445	Ow.	4-3 1/2 x 5 1/2	118	32x4	2025	2125	b2175</		